Bob Cooper's

NOVEMBER 22 2006

SatFACTS

MONTHLY

Reporting on "The World" of satellite television in the Pacific and Asia

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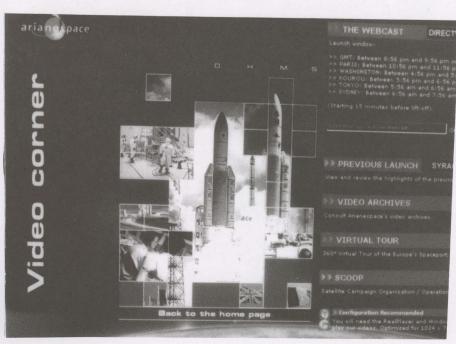
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STGold: It's in the software

✓ Latest Programmer
 News
 ✓ Latest Hardware News
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Actuators

- Superjack HARL-3618, 18" Actuator
- Superiack HARL-3624, 24" Actuator
- Superjack DG-120, H/H Mount
 - Receivers
 - SuperNET CA, Irdeto Embedded - Success, Free-to-Air
 - Dion DT-370, Free-to-Air Receiver
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- Satlook Digital Signal Meter
- Satlook Analogue Signal Meter
- Satlook Digital + Analogue combo
- Satellite finders
- Angle level measure instrument
- High Quality Compasses



SatFACTS MONTHLY

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Now year thirteen!

Not so amusing

This is one of those "which liar do you believe" stories. It began when Ariane successfully launched Optus D1 (and a companion US satellite) into geostationary orbit back in mid-October. To this point, no apparent lies; D1 was where it was supposed to be (164E - a spot 'claimed' by Australia but dangerously close to PAS-8 at 166E which went to court with Optus some years ago about just this issue). At 164E.

D1 would unfurl its 3 axis stabilised 1050 kg post launch solar collection panels and -

begin soaking up rays from the sun to generate as much as 4.8 kilowatts of power for the 24 transponder satellite.

This might be the point where the truth disappeared. Of interest, D1 is not supported by a designer's manual (a 5kg stack of paper when completed that regulatory bodies insist be in their hands before a satellite is launched), and technically, D1 does not meet "full legal co-ordination." Neither Australian nor New Zealand authorities seem overly concerned about the missing paperwork however.

D1 is not a fancy satellite, "a low cost simplistic two-door Ford," as a designer described it to me. The creator of D1 (and D2 which is scheduled for last quarter of 2007 to launch) is the handiwork of OSC - Orbital Sciences Corporation (Dulles, Virginia). But because OSC (or Optus or both) have been negligent in providing the by-law required advanced "Designer Manual" there is virtually no detail available for analysis. For all we know, D1 could be an empty crate filled with spent beer cans.

So when ten days after launch a voice on my telephone advised me, "in strictest confidence, D1 is broken," there was no design manual laying around to allow me to ask pointed questions of the deep throated male confidante. My first reaction was to write this off as a hoax, someone carrying a grudge (against Optus, Sky NZ, even me) who hoped I would jump on this story and publish something detrimental to all of the above.

The chap on the phone kept talking about some alleged problem with the 8 vertical polarity transponders D1 has on board to serve New Zealand. According to his understanding, the 8 New Zealand transponders had by accident been left connected to a horizontal polarity transmit antenna and as a result, rather than 52 dBw vertical boresight on Auckland the initial tests could do no better than 47 dBw and horizontal at that.

A startling claim, if true. Next I called an Optus client in Australia, one with a direct business interest in B1's evolving into D1. "I heard the same story - direct from Optus" this fellow told me. Suddenly the weirdo's phone tip to me took on a new level of importance. A second call to Australia expanded the story further, "Optus has a complete write-off on their hands, although possibly they could stick D1 to B3's position until D2 can be brought on line as D1R, using B3 to keep the B1 spot working."

Oh for that missing Designer's Manual - just to have a look at what D1 was supposed to do and where the "simple design" approach has cut down on operational options that perhaps Optus now wishes they had available (such as the ability to shift any transponder to any transmit antenna).

On November 15th, just after midnight, SKY NZ went ahead transferring their B1 traffic to D1, just as if none of the preceding had happened or was true. This followed the publication in The New Zealand Herald November 12th of the following brief item:

"Sky's new satellite has run into problems; problems that have been uncovered during testing. The Optus D1 satellite, which promises less rain fade and interruption and the ability to broadcast more channels of HD-TV has what an Optus spokeswoman called a 'configuration issue'. The part of the satellite some customers use might have to change but service would not be interrupted. Sky said its plans to move to the new satellite were on track." Personally, I'd feel much better about all of this if somebody had a manual!

In Volume 13 + Number 147

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Departments

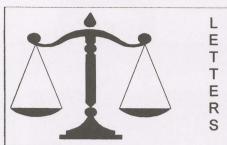
Programmer/Programming -p.2; Hardware/Equipment Update -p. 4; SatFACTS Digital Watch -p. 23; Supplemental Data -p. 26; With The Observers -p. 27

-On the cover-

D1 - in orbit but end of an era?



November 22, 2006



"LNBf LO?"

"I fail to understand the reasoning behind Sky NZ's use of a 10.75 GHz local oscillator for their new dual-head LNBFs. The units here in Australia use a 10.7 GHz LO, and they don't perform nearly as well as the original 11.3 GHz LO models as the front end is much broader; 11.7 to 12.75 versus 12.25 to 12.75. Perhaps there is more to this than meets the quick-study eye?"

G Cratt, Avcomm Pty Ltd, Sydney Australian Austar-Foxtel LNBFs, if we understand correctly, use a local oscillator frequency of 10.700 GHz, turning 11.7 into 1,000 MHz and 12.750 into 2,050 MHz. STB inputs on L-band are routinely available from 950 to 2,150 MHz. The broader - wider - the front end, the higher the LNB noise figure and the more variable the actual noise figure at any spot frequency. This would, as Garry suggests, lower the overall performance (signal 'quality' if not signal 'level') for any individual STB. See detailed discussion, p. 8, here.

Piracy truth

"Let me congratulate you on an excellent piece of journalism (SF#147, p. 7) describing the current status of satellite piracy world-wide. Your no-holds-barred approach to the subject is something the general consuming public is totally in the dark about. It is most unfortunate that one of the legitimate tools of today's industry, the satellite free-to-air receiver, has been 'hi-jacked' by a criminal element to facilitate the theft of subscription programming. I have, more than once, come close to losing control of my voice while explaining to a would-be purchaser of such hardware that modifying equipment is against the law and that I am not going to assist or provide a road map on how to do it. It may be wishful thinking, but the sooner this weak link in programmer security is repaired, the better the satellite industry will be."

Mike Kohl, Global Communications USA

Alas, receiver OEMs are in business to sell STBs and from their Asian perspective, 'pay TV regulations' in the USA, Australia, Germany are just another 'marketing opportunity.'

PROGRAMMER PROGRAMMING PROMOTION

UPDATE

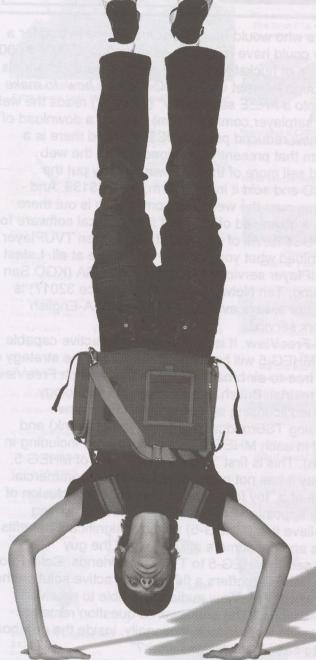
NOVEMBER 22, 2006

Background to D1 apparent failure. There are 24 Ku band transponders each 54 MHz width - that works out to 1,296 MHz of useful spectrum. Unlike B1 which it has replaced. D1 was not optimised for half-transponder performance except on the vertically polarised NZ beam. There are three beam configurations possible on the transmit side: Transponders NZ1 to NZ8 spread from 12.281.9 through 12.720.1; that is 438.2 MHz of useful spectrum from centre (12.281.9) to centre (12.720.9). This is the transponder set which apparently has been mis-wired/connected at the factory. It was supposed to be horizontal uplink and vertical downlink, 52 dBw half transponder into NZ. Alternately, the same transponders can be connected to service Australia and New Zealand with 51 dBw if used as a full transponder, 47 dBw if used as half transponders. If you are in Australia and can suddenly see vertical (NZ) signals from B1. now you know why. The next set are transponders 9 to 12. spread from 12.281.9 to 12.469.7; that is 187.8 MHz of useful spectrum centre to centre. This set uses vertical uplink and horizontal downlink with two choices: Australia alone or Australia + NZ; EIRP unknown but lower than 1 to 8. The final set are transponders 13 to 16 which are vertical uplink, horizontal downlink for either NZ alone (47 dBw half transponder) or split between NZ and Australia. Yes, there is a mess here and it will be months sorting out, as we will investigate in December.

Reason #47 why SKY NZ, very properly as it turns out, has no plans to be joining FreeView on satellite. Why should they pay as much as NZ\$500,000 per year to stick their terrestrial owned PRIME on the FreeView package (a fee that would go to TVNZ technical arm BCL) when they are already on satellite inside of the SKY package? Alternate plans - to simply turn off the NDS CA encryption for PRIME, when appropriate - will hinge on negotiations that continue over inclusion of PRIME inside of the FreeView MHEG-5 station menu system, thereby allowing FreeView customers to jump to PRIME on demand, FTA. The "model" for this already exists - TVNZ TVOne and TV2, northern-North Island is already FTA inside of SKY bouquet. There is a trade here - making it possible for TVOne and TV2 northern North Island to NOT be duplicated on FreeView as well. Stay tuned - big bucks are at risk here.

TV3 - we believe this to be true - will show up on satellite (FreeView) in widescreen (16:9) from day one. Transponder space - we don't believe this one, yet - is reported to be in short-supply for FreeView. Reason? Well, it is alleged that FreeView has had "more serious would-be programming suppliers than they have spectrum space to accommodate" on that first transponder - which is more or less self-limited to 18 programme channels for television. If - IF - this is true, well, there could be a second (expansion) transponder in FreeView's future.

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Xbox 360 HD TV?

"I understand Microsoft will be releasing HD versions of several TV shows (such as CSI) and movies (from Viacom, Paramount and others) late this month (November) fed to Xbox 360 through broadband connections. What is this all about?"

Starved for HD in NZ

There will be fees (of course) and as a typical movie will require 4GB download 'space' (through your broadband and on your hard drive), if your telephone connection is 'capped' at 2, 5 or even 10 GB per month, a 4 GB movie could be an (expensive) problem just for throughput charges. This Xbox 360 additional optional service is intended to get a jump on Sony's Playstation PS3 which also includes a similar feature (PS3 not due to NZ or Australia until March). In theory, if you have a North American configured Xbox 360 (as in one purchased there). and a spare 4GB or more of download space and time available, you could from NZ sample the America-only service but you will have to sit and watch the movie chosen within 24 hours of downloading after that it will disappear from your hard drive! Oh yes, "HD" is relative - it will arrive as 720P, not 1080i.

BISS?

"One of my clients, located in eastern Russia in a location I am not free to disclose, notes that Russian services such as GTRK (originally Moscow 1) have elected to use a 'loose' encryption system to satisfy the Russian equivalent of the copyright cops, known as BISS. Of course the kind of 'FTA' receivers equipped with card readers which you described in SF#146 instantly decrypt this CA format. Of greater interest, perhaps, is the overspill from Alaskan beamed USA signals carrying all of the American networks arriving in far Eastern Siberia and the willingness of numerous Alaskan based firms to supply (for a fee of course) suitable receivers and cards to an ever growing number of Russian viewers who now include Americans who are contract labour in Siberia performing a variety of high-tech functions! My most recent assignment involved creating a ten channel SMATV/CATV system for approximately 30 TV outlets using C-band Russian SECAM and C-band USA NTSC services with appropriate transcoders and modulators sourced in Taiwan. The frontiers of TVRO still exist - they are simply harder to find with each passing year!"

Name withheld, Washington State (USA)

Editor's note: Photos are promised!

HARDWARE EQUIPMENT PARTS

UPDATE

NOVEMBER 22, 2006

The hucksters who would have consumers believe that for a modest fee they could have (pick a number) 1,000, 2,000, 3,000 or more - all levels of hucksterism hype are out there - channels of television through Internet on their PC. "Here's how to make your computer into a FREE satellite TV" (receiver) reads the web site (http://www.satplayer.com/site2.htm) offering a download of software for "a new reduced price of US\$67." And there is a warning - the firm that presently downloads using the web believes it would sell more of their software if they put the software on a CD and sold it in hard form; for US\$139. And stopped delivering over the web. The competition is out there already offering a download of similar if not identical software for a more modest US\$49. All of which is strange when TVUPlayer and others download what you need for no charge at all. Latest changes in TVUPlayer services available: ABC USA (KGO San Francisco) missing, Ten Network Australia (service 32017) is newly listed but not always available; first non-USA-English speaking network service.

MHEG-5 and FreeView. It is now official; interactive capable software using MHEG-5 will be a major element in the strategy of New Zealand's free-to-air broadcasters as they launch FreeView satellite and terrestrial. British firm Strategy & Technology Limited has signed licensing agreement with FreeView consortium utilising TSBroadcaster (employed at uplink) and TSPlayer (used in each MHEG-5 capable receiver, including in EPG application). This is first "outside of UK" use of MHEG-5. where by the way it has not been an outstanding "commercial success" - more of a "toy for the boys." Hyping the inclusion of MHEG-5, newly appointed FreeView head Steve Browning claims, "We believe this (MHEG-5) will offer significant benefits to broadcasters and consumers alike..." while the guy responsible for selling MHEG-5 to TVNZ and friends. Colin Prior. chimes in with, "MHEG-5 offers a flexible interactive solution that will ensure the whole FreeView audience is able to receive interactive applications." The unanswered question remains: ""How many viewers want to look, optionally, inside the gearbox of a new Ford to see how the gears work?"

FreeView rumour department; and so labelled. New, under development, TVNZ hosted 'FreeView' website will offer MHEG-5 equipped DTB-S FTA receivers for NZ\$250, \$450 including installation with FreeView consortium acting as 'sales agent' creating on-line orders and assigning 'affiliate accredited installers' to do the job. Meanwhile Hills is to supply Strong brand sourced STB to aerial riggers for resale. At least one major supplier of satellite hardware has 500 non-MHEG-5 STBs in the warehouse ready to pop on the home electronics market - and DSE is reportedly not going to be stuck to a MHEG-5 version for sale, will also offer lower cost non-MHEG-5 STBs as well. Our prediction? \$299 installed by July 2007, non-MHEG5.

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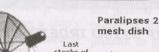


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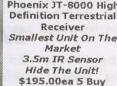


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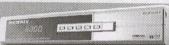


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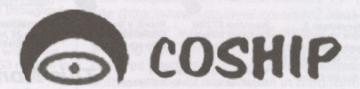
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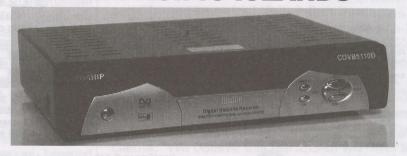
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SMART Cards that are not secure: True or False???

Our October issue report (#146) attempted to survey that grey world dealing with various schemes to subvert security of pay television, including the distribution of FTV (free to view) movies using Internet P2P technology. The overall analysis suggested that while a minority of the security systems now employed have to date kept piracy at bay, on a world-wide scale the majority of systems employed have enough functional flaws to keep the grey market folks coming back; again and again.

Naturally this sort of analysis does attract some sensitivity from those who design and employ security systems. In their public image minds, their creations are invincible. And that leads to the inevitable "response" - a press release or quasi-defensive report placed in a publication of some importance to their business goal. Which brings us to the following (edited by SatFACTS) release.

"Smart as they are, the protective codes of smart cards can be cracked using off-the-shelf technology. But the latest secure chips developed by one European team may soon be better equipped to defeat the would-be attackers. Some two million new smart cards are rolled out each month, so the encrypted personal data that people store on these cards must be safe. The security threat is growing as the electronic devices capable of breaking the card codes become cheaper and more powerful.

"It takes little more than an oscilloscope and a standard PC to mount a digital attack on an unprotected smart card,' suggests Klaus-Michael Koch. He is co-ordinator of the IST project SCARD, which aims to increase the security of chips on smart cards.

"With equipment like this and some know-how, attackers can expose the content that a smart card is supposed to protect. Using techniques such as side-channel analysis (SCA), they can reveal part of a secret key, notably by examining a chip's power leakage as it performs computations or by scrutinising its thermal or electromagnetic radiation. If the card's owner is the attacker, he or she could even upload money to an electronic purse, access a satellite TV service, or claim to be someone else.

"Under the SCARD (project) the designers have put together a 'design flow' that allows semi-automatic implementation of countermeasures. The design flow is the digital design of a chip -- the specifications, modelling of performance, algorithms and functionality up until the stage when the chip developer can start the synthesiser and compiler. Such a design process may require several years of effort.

"In-chip countermeasures are included during the design period. They cannot be simulated, so developers experiment with the shielding of a card's chip to limit temperature and voltage variations, or step by step individual transistors are placed on it by hand.

"For the hardware security issue, the partners developed prototypes of a design flow and carry out chip testing. This in turn paved the way for an automatic chip design process which will allow other researchers to create follow-on chips with

'There is nothing new here...'

"Our card is not one hundred percent secure" says it all. Today's commercial pirates do not work with microscopes ad oscilloscopes any more. The level of piracy here have access to sophisticated equipment the same equipment which the people who make the cards use in their design work."

(SF's piracy consultant)

even greater security. Design co-ordinator Koch believes the effort is paying off. 'We have succeeded in making the hardware more secure against side-channel analysis. The chip we have built as a master creates a reference which allows measurement of countermeasures against differential power attacks.'

"To test leaky circuits, the SCARD team has developed two countermeasures. The first introduces constant power consumption, without respect to the tasks actually being performed at any instant. Koch notes, 'Each clock cycle has the same energy. But this process must be precise since even a three or four percent power consumption differential can be detected. The second step involves adding random values to the chip, masking the circuit's real values. Even noise could be added although at present this is not feasible due to energy-loss restrictions.'

"Alas, even with these new designs, Koch admits, 'Our new chip is not one hundred percent secure although it represents a quantum leap forward in security.'

"The project results are currently being disseminated through teaching - some of the project partners are universities or technical enterprises."

Obviously, the warfare goes on, however well hidden from the general consumer press types. This is not a subject we prefer to visit routinely but at least once per year it seems prudent to properly assess the status of both the piracy folks and the programmers and chip designers, to stay current.

The 'core' of the piracy problem

"The fact is smart cards are indeed becoming more and more secure but as Koch admits, nothing (yet) is 100% secure. Remember - the smart card 'heart' remains a CPU which can stumble and choke when driven beyond its operating limits. At that point, if the pirate is exceptionally skilled, the CPU will spill its guts revealing partial or complete code. And in those cases where this is not possible, there remains the ultimate tool of all chip reverse engineering - the electron microscope which can read the 'bits' one at a time. 'Time' on such a laboratory instrument, sufficient to disassemble a chip's contents, runs upwards of US\$50,000 per chip analysed. Expensive? Yes, time consuming? Yes. But if such a 'hack' results in the sale of even 10,000 cards at US\$200 each, that's \$2,000,000 in sales."

(SF's piracy consultant)

D1 and D2 - The Promise and The Reality

D1, as this is written, is not; not operating, that is. But for our analysis here we will be optimistic that it will be functional and as a result pay-television in New Zealand will (shortly) be entering a new, much advanced phase.

SKY's business success is nearly textbook perfect, a tribute to management and the determination to make it work against what has been elsewhere in the world anything but a string of financial success stories. And it is because of the commercial success that this next, new phase of growth using not one but ultimately two brand new satellites will be a major technological step forward. And yes, these changes will affect you, even in Australia.

D1 is a purpose built satellite from Orbital Sciences; it would be described as "basic" rather than pushing new major technological barriers. It is lightweight (1,006 kg - compare that with co-launched DirecTV 9S at 2,600 kg) and if an automobile (with which it has similarities in size and shape), it would be a Ford two-door. The primary claim to innovation is in the powering system (Gallium Arsenide solar cells, Lithion Ion batteries) and the output power per transponder (150 watts), both upwardly mobile from the last Optus satellite; C1.

D1 alone is only a part of the new-for-SKY story - in fact it is little more than a replacement for B1 Stronger, better powered, and brand new - yes. Unusual in any way? No. Its primary purpose is to replace past-use-by dated B1 and nothing more.

Now add D2 to the mix - very similar in physical design to D1, and loosely scheduled for launch "sometime in 2007" and you have a number of interesting new technical scenarios developing. D2 is D1 on steroids - still mostly basic, just bigger and more capable. And whereas D1 is a direct replacement for B1, D2 is a new flight partner for C1; both will, give or take 70 miles in space, fly in the 'same box' and essentially act as backups to the other. They can do this because D2 will be equipped with both the 'FSS' (standard to date for us) and 'BSS' (new here, setting aside Intelsat) bands. Think of terrestrial television and VHF channels, later

FSS? BSS?

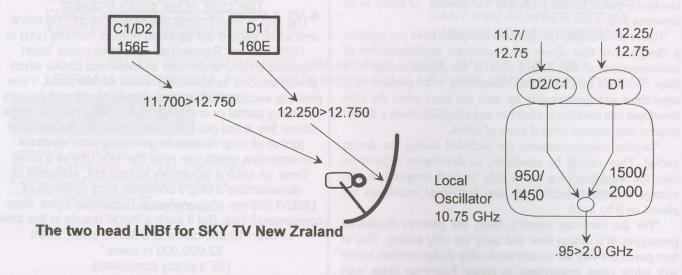
Any Ku-band satellite using the 12.25 - 12.75 GHz downlink band is classified by international agreements (dating back to 1979) as 'FSS'; Fixed Satellite Service. It is the frequency band in use which determines the classification. 'BSS' designates a satellite operating in the next lower (down) band: 11.7 - 12.200 GHz. Yes, both are by design 500 MHz (0.5 GHz) in 'bandwidth.' In heavily populated areas, the 500 MHz increments extended downward even further (11.1 - 11.7, 10.6-11.1). Think of 'BSS' as an expansion area for the always-use-first 12.25-12.75 GHz region and those further 'down' as expansions of the expansion. BSS stands for 'Broadcast Satellite Service and way back in 1979, the original planning considered each 500 MHz band as having some distinct use. Alas, all of that has been forgotten today.

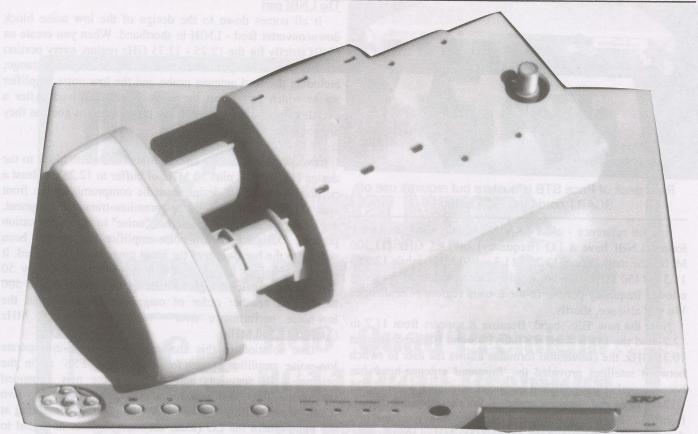
amended with UHF channels. 'FSS' would be the equivalent of VHF (only because it came first) while 'BSS' would be UHF. So the bottom line is "more transponders from the same spot-in-space" (geostationary orbit position) simply because each satellite restricts its operation to frequencies which the alternate satellite does not use from the same location. And that brings us to the reception antenna 'system' - made up by the reflective dish, the low-noise amplifier, and the frequency

The LNBf Math

LO = 10.75 (10,750 MHz)
Input from D1 = 12.25>12.75
L-band output to STB = 12.25-10.75 = 1500
12.75-10.75 = 2000

Input from D2/C1 = 11.70>12.75 L-band output to STB = 11.70 - 10.75 = 950 12.75 - 10.75 = 2000





You know something quite evolutionary is happening here when the STB has either shrunk to the size of the LNBf, or, the LNBf has grown to the size of the STB! This is the new dual-head 156/160E twin feed LNBf created for the unique two-bird configuration which SKY NZ is heading for when D2 is added to the flight location of C1.

conversion network. It is the frequency conversion network that counts here.

The STB

At the end of the reception line, the indoor end of the RG6 cable, sits a set-top-box designed to receive the output of the LNBf; typically some or all of the L-band frequency range 950-2,150 MHz. Quick subtraction reveals that if you subtract 950 from 2150 you have 1200 MHz of "L-band space" into which the output of the LNBf can be sent. Anything that lands between these two points (or 950 and 2,000 in the instant situation with SKY NZ Pace brand decoders) can be - will be -"processed" as a standard or variant of MPEG-2. In other to create some sort of "frequency sharing system" that allows shortly.

two (or more as is the case in Europe) different satellites to be fed into the "L-band window" without creating interference between the two (or more) satellites.

The SKY NZ plan

Satellite D1, 'FSS,' will downlink between 12.25 and 12.75 GHz. If the LNBf has a LO (local oscillator) frequency of 10.75 GHz (10,750 MHz), the 'conversion' of that 'FSS' block will end up flowing down the cable between 1.5 and 2.0 GHz (1500 and 2000 MHz). The math and explanation appears on page 8. That means all SKY NZ LNBf installs using a 10.75 GHz LO will in fact be transmitting to the STB in the words, "nothing unusual is happening here." What remains is 1500-2000 MHz region. New problems? We'll investigate,

PACE DS230NNZ is the latest STB for SKY NZ homes; LNB switching to D1 or D2 head is standard 14/18V approach.



SHARP BS1D2AQ112L with LO at 10.75 GHz produces feed from either of two probe heads as selected by user programme menu.





Rear deck of Pace STB is austere but requires use of SCART cords (no RCA outputs).

Just for reference - older SKY NZ installs using an earlier format LNBf have a LO (frequency) of 11.3 GHz (11,300 MHz). the math here is 12.25 - 11.3 = 950 MHz while 12.75 - 11.3 = 1450 MHz. In other words, older installations are using a lower frequency portion of the L-band region. A challenge? We will also see, shortly.

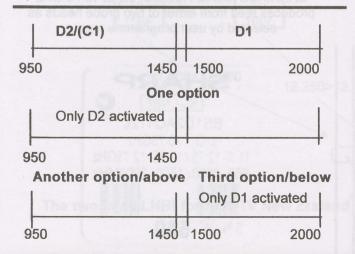
Now the new 'BSS' band. Because it appears from 11.7 to 12.2, and the LO is fixed for both FSS and BSS reception at 10.75 GHz, the conversion formulae allows the user to switch between satellites provided the 'front-end' antenna-head' has been properly designed. Into one head, equipped with a 12.25 - 12.75 front-end 'antenna probe,' flows the downlink signals from D1. They are amplified and frequency converted and sent down the coaxial cable in the 1,500-2,000 MHz L-band space. Into the second head, equipped with a 11.7 - 12.2 front-end 'antenna probe' probe, flows the signals from D2. They are amplified and frequency converted and sent down the coaxial cable in the 950 - 1450 L-band space.

There are several different formats available to the system designer:

1/ He can 'power' (activate) both heads simultaneously, in which case D2 appears at the bottom end and D1 appears at the top-end of L-band;

2/ He can 'power' only one head at a time, limiting reception to either D1 (1,500-2,000 MHz), or, D2 (950 - 1,450 MHz).

In the first option, there is a risk that signals in the 12.25 - 12.75 MHz region on D2 (remember - it has both FSS and BSS on board) could leak through and appearing in the same L-band spectrum as the D1 signals, cause interference. In the second option, there is a 'switching' command required when consumers, totally oblivious to the use of two satellites, select a programming channel which is actually available on the "second satellite."



The LNBf part

It all comes down to the design of the low noise block downconverter feed - LNBf in shorthand. When you create an LNBf strictly for the 12.25 - 12.75 GHz region, every portion of the design is optimised for that input frequency range; including the feed antenna probe and the low noise amplifier stages which first boost the weak signals received. After a decade of getting it right, most are pretty much as good as they are going to ever be.

Now, when you add a new 550 MHz bandwidth block to the design (11.7 - 12.2 plus 50 MHz of buffer to 12.25), at least a portion of the LNBf design must be compromised; the front end. This is the low noise premium-transistor segment, designed to add very little internal "noise" to the amplification process. Designing a low-noise-amplifier has always been subject to the bandwidth of the input range being amplified. It is quite simplistic to get a low noise function over say 50 MHz, a magnitude of higher challenge to expand that to 500 MHz. And another order of magnitude to widen out the low-noise performance over an input of 1,050 MHz (11,700-12,750 MHz).

One solution to this challenge is to build-in separate low-noise amplifier stages for each band; 'FSS' as in the original LNB segments and 'BSS' for the new expanded bandwidth. Alas, that requires a duplication of parts - two totally separate front-ends - one for each band, combining at the point where the LO (local oscillator) injects its signal to create the Ku to L-band frequency conversion procedure. And more parts increases the cost, and, multiplies the possibility of LNBf failure.

None of these are easy design challenges - nor easy user choice selections. Choosing one wideband front end is the least expensive but also the poorest performer; choosing two separate front ends (one for 'FSS' and one for 'BSS') raises the cost and increases the risk of failure.

An unexpected LNBf problem

SKY NZ switched to 10.75 GHz dual head LNBfs sometime ago - they claim around 200,000 of the newer models in use in a universe of approximately 600,000 installations. Remember that the 12.25 - 12.75 GHz region, that used by B1/D1, ends up being frequency converted to the 1,500-2,000 MHz region/. This has not been without field problems.

Problem number one is the higher L-band frequency, between the output of the LNBf and the input to the STB/receiver. RG6 coaxial cable was never originally intended for use above 1,000 MHz but better quality control and improved shielding has allowed it to work there - to at least 1,500 MHz. But at some point above 1,500 MHz, the RG6 cable commonly employed from dish/LNBf to STB begins to fail; rapidly. Mostly this is a problem relating to 'shielding' - the aluminium foil and copper/aluminium 'woven' metallic 'braid' used in the manufacture of the cable.

And it is not only the cable; connectors (the infamous 'F' series) become less and less reliable as the frequency in use increases. You might get by with a 'hex' crimp (one that leaves five or more 'points' on the connector shield) at 950 MHz, even 1,450 but by the time we climb into the 1,500 - 2,000 MHz region, well, those 'holes left' when the 'hex head crimp' is formed allow massive amounts of signal egress (signal leaking out) and much more to the point - 'signal ingress.' That's when outside signals leak into the cable.

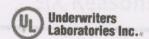
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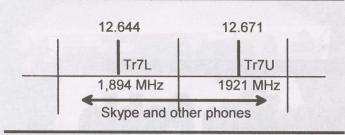
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So start off with improperly shielded cable, magnify the situation with non-compression design F fitting crimping tools and you end up with -?

Potentially, interference. From? Other users of the region between 1500 and 2,000 MHz. Which are? A wide variety of telephone devices sold at the nearest electronic emporium, and on the web. Such as? Skype phones, Vtec phones. What is that all about?

Wireless telephones operate in the microwave frequency region - there are several 'bands' set aside for this purpose from approximately 900 to 2,500 MHz. The concept with "take it home and plug it in" telephones is that they are not individually licensed (rather they are approved as a 'class') to occupy frequency spectrum. They are not powerful (typically 100 mW or under) but when they are physically close to a

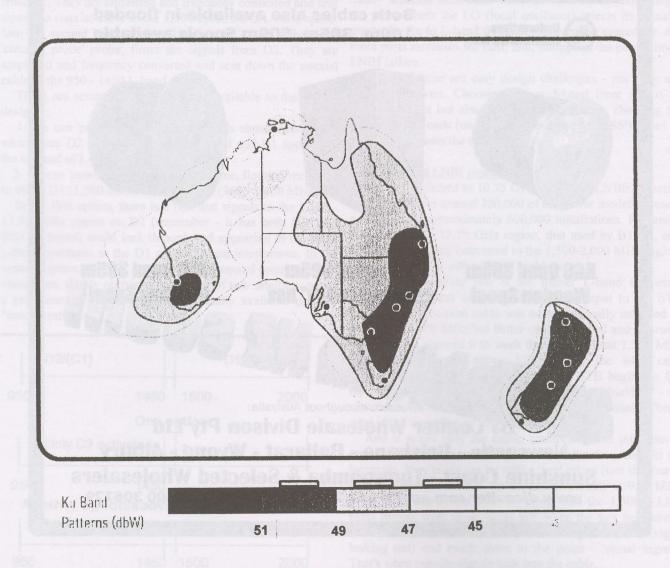
reception device such as a satellite STB and they 'share' one or more common frequencies, well - accidents happen.

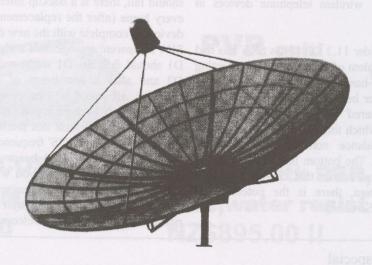
For example, let us look at SKY NZ transponder 7L / 12.644Vt. In the conversion process, 12.644 ends up being centred on 1.894/1,894 MHz. Unfortunately, Skype telephones and many others spread themselves out in the region +/- 1,890 MHz. So when a SKY NZ customer activates their Skype (or similar) telephone, there is 100 mW or more of RF energy radiating throughout the immediate area. And leaking through the inadequately "shielded" RG6 cable running from the LNBf to the STB. Worse yet, the latest PACE STBs themselves have not-well-designed input tuner shielding in this frequency range. So what happens?

The Skype (or other) 1.890 GHz signal penetrates the RG6 cable shielding, and/or the actual STB box into the tuner itself and wipes out the satellite reception from the following transponder 7L signals: (1) ESPN, (2) Sky Movies 2, (3) Nickelodeon, (4) TV3, (4) C4, (5) Sky Box Office Movies, (6) KTV2 - South Korea and (6) CTV6 (China). Wipe out? Blue screen display - "rain fade." But not quite true - it is an RF overload originating in a customer device that is located close enough to the SKY reception equipment (cable, STB) to interrupt the SKY reception for as long as the external device is in use.

So who is responsible here? SKY? The customer?

'FSS' predicted coverage from satellite D1 located at 160E as replacement for Optus B1 at same location.





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There are presently hundreds - likely many more - similar unsolved cases of interference on the SKY technical department books. The solution? It is a difficult "sell" to satellites? They say it is to ensure "growing room" convince pay-TV clients their system is losing reception because of some other "gadget" they have in the house - after all, is SKY not supposed to be "interference free" and not subject to problems such as this? How do you encourage customers to give up their wireless telephone devices in favour of SKY reception?

And in fact even with the older 11.3 LO LNBs SKY has had an unexplained reception problem of a similar nature affecting transponders 5L/12.519 (L-band 1,219), and 6L/12.581 (L-band 1.281), this has never been resolved. The 1,219 and 1,281 frequency band is 'shared' at the terrestrial level by amateur radio operators (of which this spectrum is little used) and a number of air guidance communication systems (including high power radar). The bottom line in all of this is that if there is a strong in-area carrier that can "leak" into a SKY reception L-band system, there is the potential for interference (consumer 'Blue Screens').

The longer term reason for D2

So what is the rationale for SKY NZ opting for two transponder space in the 'BSS' band through D2 on which they can expand the total number of channels on offer. There is probably more to this than that explanation.

First there is the comfort (to Sky) in knowing that if D1 should fail, there is a backup satellite (D2) already in place, in every home (after the replacement of existing 11.3 LO LNBf devices is complete with the new dual head 10.75 GHz LNBf). SKY's apparent arrangement with Optus is a 'guarantee' that if D1 should fail, the D1 transponders would be transferred to D2 and after a few hours of reprogramming software in receivers, all would be (for viewers) "back to normal." This works for SKY because it gives them a form of insurance, and. it works for D2 because that satellite has been designed so that the same 'BSS' and 'FSS' frequency bands can be used twice once on a New Zealand beam and again on an Australian beam. (That ought to tell you what the chances are of your picking up the NZ beam in Australia or vice versa - zilch, zero, nada.). Yes, D1 + D2 are a major step forward but not without new technical challenges; welcome on board!

Another "gold-plated" special

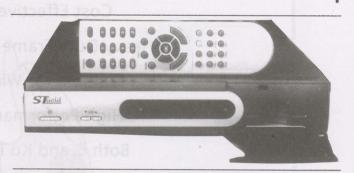
The answer of course is SOFTWARE!

There is something magical happening with the software in satellite receivers. Yes, every new edition seems to do better than those previous, and yes we are rapidly approaching a level where 'shared software' between suppliers leaves less and less to differentiate between various brands and even models. The 'magic' part is that has become progressively more difficult to tell the difference between a FTA version and a CA version. In recent years past the CA folks offered more than CA as a reason to upgrade from FTA only. And then the FTA-plus models hit, those that would (for a year or so) do limited amounts of CA even without the aid of a CA card. And now - well, while you still may require a card for most CA applications, the great equalisation of receivers is almost complete.

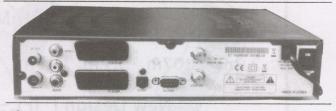
STGold, a brand name distributed through dealers by Melbourne Satellites is an apt example. There are two models in the line, the ST2000F where the F apparently denotes "free to air" and model ST4000IR which tells you Irdeto is included. That's the CA system used by Aurora and a number of other services which makes the IR model a candidate for being a viewing tool for a number of Australians.

We were first 'turned onto' the 4100IR by a reader in - well, let's say a reader who is not in Australia; but close. In recent times there have been subtle software changes in a number of the Aurora channels and our reader was having a difficult time keeping up with the changes using various 'known good' authorisation cards. His note to SatFACTS read something like this:

"I have found the receiver we have been looking for; the ST4100IR works where others would not and a number of cards we had given up on are suddenly working again for us."



STGold is modern design CA capable L-band receiver capable of C + Ku reception with straight forward to use software and high quality performance.



Before you read something akin to piracy into that, be advised these were legit cards issued by Optus themselves which had for whatever reason suddenly decided to fail. Our reader was, well, 'frustrated' until he ordered in a 4100IR in his never ending search for a receiver that would function reliably. We thought that sounded like a receiver we should test here and advise others about.

Melbourne Satellites shipped over a pair of receivers - the 4100IR and the FTA version 2000F. Both came out of their respective boxes and immediately functioned. The IR of >

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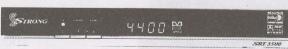
Email; guido@satworld.com.au

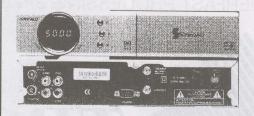
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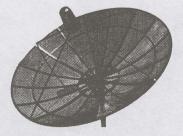
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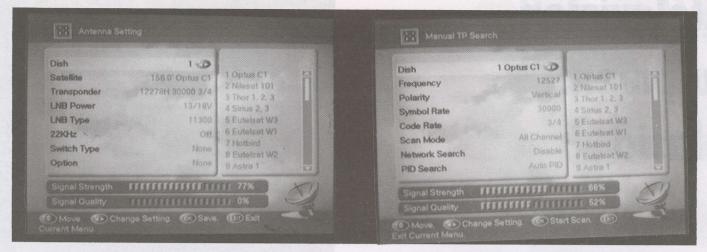
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Receiver is preloaded from supplier Melbourne Satellites with C1 in #1 position - nice not to have to scroll for, or, load Aurora channels!

In full scan position, factory loaded transponder data is dialled up and checked by software. Manual scan by entering individual parameters is also available.

course was somewhat limited here in rural New Zealand simply because so much of what is Aurora simply does not reach here, reliably (it is that 'footprint thing' again).

There is very little this receiver will not do which you might wish from a STB. There are some negatives of course - the manual, while extensive and reasonably readable in Asian-English, still provides a few chuckles. Perhaps those software designers who are now 'sharing' (if not willingly) have not quite come up to speed with their sharing of written manual instructions. Example: "Do not put heavy stuff such as a TV on the receiver." "Stuff????" How about the definition of stuff: "Valueless matter, trash, refuse....." You gotta love what happens to English when it starts out in pristine and definitive Mandarin before someone is asked to translate it. Wouldn't you love to know what the original word before translation really meant!

The details?

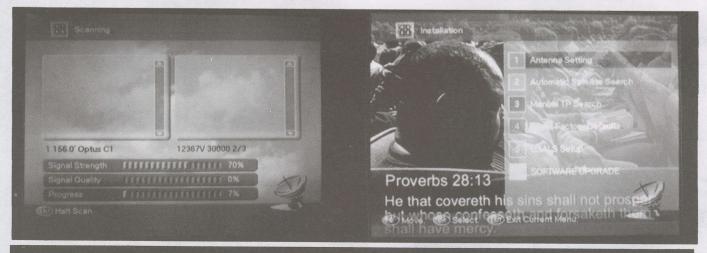
Well, it is not blind search and we can all debate why any receiver would still be built-in with factory loaded satellites and transponders. Here's a novel idea: Load one reliable, always there transponder for each satellite and then include blind search. The single transponder would allow you to locate the satellite in question (the 'dish pointing thingy) and then you turn on the blind search and go have a cup of coffee (or read the manual). In this way the receiver out of the box would be

updated with the then-current transponders and you wouldn't need all of the extra memory space used to store transponder information from the factory on birds you will never see or services no longer operating. Just an idea.

This receiver has specs which if you closed you eyes and someone substituted the same printed "A.2 Technical Specifications" page from another manual, you probably would not notice the difference. Asia-in is Asia-out these days. Ys, the IF bandwidth is 55 MHz (not 54 - right IF!); 8 < MHz for symbol rates below 8 Msps. Yes it does 1-45 symbol rates but the data rate is limited to 15 Mbit/s (HDTV? Not quite). There are twin SCARTs (TV and VCR) and fibre-optic digital (S/PDIF) audio output (hey - has anyone ever used this on any receiver - how much better is it anyhow?). The PCMCIA slots (2) are "Type I and II," whatever that means. The TV modulator is PAL only (OK - so who would want NTSC?) tuneable over the usual 470 - 890 MHz range. They claim 30 watts power loading but it runs cool (very cool in fact provided you don't "stack stuff" on top of it!). Here's an interesting question - which for the STGold is no different than other competitive brands. They say the operating temperature range is 0C to 40C - that would one assumes be the ambient air temperature surrounding the STB (again, no "stuff" stacked on top. So what happens at -1C or 41C? Does the STB quit? Do icicles form?

Bar (bottom) indicates signal strength (someplace around 40% will produce stable images) and signal quality (in region of 30-35% for non-flawed images).

Menu information can be displayed over received video for most settings within "Installation" sub-chapter.



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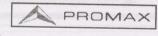
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http://www.microwavefilter.com

"A.2 Technical Specifications"

Input frequency range: 950>2150 MHz RF Input signal level range (window): -25>-65 dBm RF impedance: 75 ohms (unbalanced) IF bandwidth: 55MHZ but 8MHz for under 5 Msps LNB powering: 13/18Vdc, 14/19V dc, 0.5amp max, protected

LNB tone switch: 22kHz, 0.6Vpp DiSEqC: Version 1.2, tone burst A/B

Demodulation format: QPSK Symbol rate: 1>45Msps, SCPC + MCPC

Transport stream: MPEG-2 ISO Input rate: Max 15 Mbit/s Video: MPEG-2 MP@ML

Audio: MPEG-1/2 audio layer 1.2 Aspect ratio: 4:3, 16:9

Video resolution: 720x576(PAL), 720x480(NTSC) Audio mode: Stereo, dual channel, joint stereo, mono

Audio sampling frequency: 32/44.1/48kHz LNB input connector: F

LNB loop out: F connector TV SCART: RGB, CVBS, audio L & R out

VCR SCART: CVBS, audio L & R out Serial port: RS232C D-sub male Fibre-optic connection: Digital audio output RF modulator/RF connector: 75ohm unbalanced PAL type RF modulator/frequency: 470-860MHz RF output: PAL B/G/I/D/K (menu selected) Input voltage: 90>240V AC (SMPS design supply) Power consumption: 30 watts maximum

> Weight: 1.5Kg Operating temperature: 0>40C Storage temperature: -40>65C PCMCIA/slots: 2

PCMCIA type: I,II DVB common interface standard Positioner (*): M1, M2, Pulse, +5V dc, gnd, skew Output voltage/current: 36V dc, 5a max (10 minute limit)

Sensor type: Reed or Hall effect switch (*) Positioner is option

Source: Melbourne Satellites

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Summary:

A good working unit, probably reliable, all of the basics then-current satellites and transponders as of date of a few reception problems for you!

manufacture; yes, you can web update using RD232). the 4100IR and the 2000F share most of the common features (short of blind scan and the blind allegiance to pre-loading the recorded here, save only the CA function. This one could solve

Onward, upward, downward?

The Internet web delivered video pot just keeps on boiling

As reported in SF#146, the TVUPlayer site (SF#145, p. 19) site which contains a number of "unusual" pay-TV services has been undergoing changes on a weekly basis; HBO Movies, for example, available in September had disappeared by early October. The site has now attracted the legal concerns of copyright attorneys including some very highly paid TV broadcast people. An example.

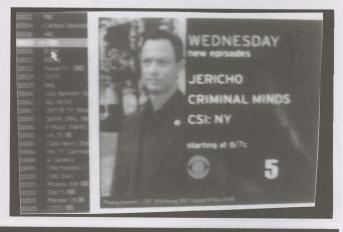
NBC Chairman Bob Wright has called for "a war on our economic survival fought with the same vigour and intensity as the present war on terrorists." Wright singled out TVUPlayer as an example of "a service which threatens our economic survival as a nation." His concern gores to the heart of the copyright challenge which some (if not yet many) see as a registration process that has outlived its usefulness as a tool for protection of creator rights.

You can find NBC programming, through San Francisco network affiliate KNTV, within the TVUPlayer menu. Along with that of ABC, CBS and Fox.

The TVUPlayer enigma has now attracted a number of snooping eyes and ears. The service is registered to a post office box address in the San Francisco Bay Area, and one investigator believes the site's server is actually located in Shanghai (China!). The registered owner of the www.viidoo (named) site has an oriental name. On a late October Monday (Sunday evening in the USA) SatFACTS went through the site and found NBA Basketball, NHL Hockey and Disney had the largest number of viewers ("peers" in the trade) while ABC's "Desperate Housewives" was outdrawing CBS's "CSI." This site obviously costs big bucks to maintain and there remain many theories concerning their income stream.



THIS season's Desperate Housewives (ABC-above) and CSI (CBS-below) live and in real time.





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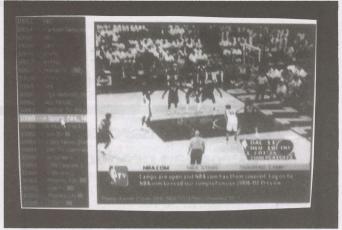
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NHL (hockey, live) and NBA (basketball, live) were the top "peer use" services when SatFACTS compared channel usage on a late October on a stateside Sunday evening. This suggests the primary users are people travelling (on the road) perhaps connecting from a motel or hotel room either in or (more likely) out of the USA (most in-USA motels/hotels would have these channels available through in-room TV sets).

Obviously offering this service requires elaborate software, hundreds of thousands of miles of fibre optic lines, significant CODEC equipment and not a few dollars per month to transplant (for example) Animal Planet from (let us assume) a California cable or satellite reception point to a distant server. So where are these dollars coming from?

One investigator found evidence that as of late September TVUPlayer had just under 15,000 "registered" users. If that sounds impressive, we think not. NBC's CEO Wright called it, "The Napster of video." Again, we think not; Napster (which allowed free trading of pre-recorded music) reached over 7,000,000 "registered users" before its walls crumbled under attack from the various music copyright groups. Napster was especially attractive to the under-25s who found peer to peer music sharing almost addictive; TVUPlayer appeals to a much smaller base of folks who care enough about specific TV covered events to want to bother with the software and the often erratic nature of the delivery service.

About which. The image you see on your PC screen is (1) low pixel count - as in not ready for being connected to a big screen, (2) often lacks contrast and brightness highlights

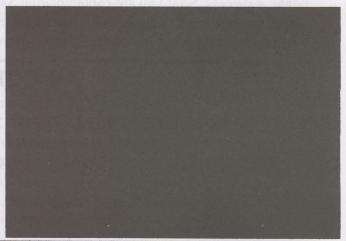
(Disney for example looks that way - always), and most important, (3) subject to "circuit losses."

About which. When NBC San Francisco (KNTV) is taken "off-air" or more likely off of satellite at a California location, it must then be decoded, turned from an analogue to a digital (MPEG-2) signal, fed through a state of the art CODEC machine to throttle back the bandwidth (which explains the less than big screen image). At this point the signal must be transported from the reception point to the server, and if that is actually in Shanghai - well, add in a quarter of the way around the earth to the equation. Now out of the server towards you, through fibre and other interconnection systems until it finally ends up at your local telephone exchange. And finally to you through what for most of us will be a few kilometres of copper wire installed decades ago with only narrow band voice in mind.

The opportunity for "circuit errors" to creep in are many, and constantly changing as any of the links between the origination point and your viewing location experience variations in network loading. The wonder here is that you can actually see (and hear) anything at all! But for now it is the newest game in town and if nothing else educational to watch develop.

Al Jazeera is now carried by TVUPlayer although at the moment we checked its content the service was "down" for site maintenance (note the three language announcement - below, left). The original HBO service has been replaced with something labelled 'Hollywood Movies' which may have originated in Hollywood, but not recently, and certainly not with the Mandarin sub-titles. Plus - the throughput quality is, in comparison with others, quite poor (below - right).





SatFACTS Pacific/Asian MPEG-2 <u>Digital</u> Watch: 22 NOV, 2006

Bird	Service	RF/IF	# Program	FEC	Msym
		&Polarity	Channels		133
Thcm5/78.5	SkyChAust	3695/1455H	up to 3	3/4	5(.000)
21101113770.3	ANT Greece	3672/1478H	1 TV	3/4	13(.333)
	TARBS ME mux	3640/1510H	12TV, 12 radio	2/3	28(.066)
	Ch Nepal	3626/1524V	1	3/4	15(.556)
	Mahar mux	3600/1550H	11TV, 1 rad	3/4	26(.667)
THE R. P. LEW.	RR Sat mux	3551/1600H	8TV,10 radio	3/4	13(.333)
	TVK Cambodia	3448/1702H	1TV	1/2	6(.312)
	TARBS/Th5	3480/1670H	12 TV+radio	2/3	26(.667)
1-11-11-11	Thai Global	3425/1725V	up to 7?	2/3	27(.500)
InSat 2E/83	ETV mux	4005/1145V	6+ TV	3/4	27(.000)
	Hyd Dig 2E	3910/1240V	1	3/4	5(.000)
	Kairali TV	3699/1451V	1	3/4	3(.184)
FIRE	Indian mux	3643/1507V	3	3/4	19(.531)
	Sky Bangla	3430/1720V	1TV	3/4	6(.000)
NSS6/95E	Ant Pac (Greek)	11.104H-Australia	1 TV	3/4	2(.800)
As2/100.5E	Guangdong TV	4075/1075H	1TV + radio	3/4	6(.000)
	Euro Bougt	4000/1150H	5TV, 19 radio	3/4	28(.125)
Andrew Control	SatLink	3960/1190H	3TV	3/4	27(.500)
ASTRONOM STATE	Reuters News	3905/1245H	1TV	3/4	4(.000)
	WorldNet	3880/1270H	4+/18radio	1/2	20(.400)
BOTTO STATE	APTN Asia	3799/1351H	1	3/4	5(.632)
	Reuters/Sing.	3775/1375H	1	3/4	5(.631)
	Macau MUX	4148/1002V	5TV	3/4	11(.850)
	Dubai MUX	4020/1430V	4+, radio	3/4	27(.500)
The Contract	Russian/Israel	3832/1318V	up to 4 video	3/4	7(.271)
PERMIT	ArabSat#2	3820/1330V	8+ video?	3/4	27.5
A second market	Trace TV	3792/1358V	1	3/4	2(.400)
LAST OF BUILDING	BYU-TV	3767/1383V	1 + 20 audio	1/2	6(.530)
Total week a	3-ch miniMUX	3752/1398V	up to 3	3/4	5(.640)
To a service of the service of	Saudi TV1	3660/1490V	7+/tests	3/4	27(.500)
Express2/103E	Various-tests	3675/1475R	2	3/4	4(.340)
As3S/105E	Chinese regionals	3671/1471V	2	3/4	8(.932)
	CETV digital	3680/1470H	1+ TV	3/4	26(.670)
	Zee bouquet	3700/1450V	10TV	3/4	27(.500)
TO PARTY I	Ch News Asia	3706/1444H	1TV (+)	3/4	6(.000)
	Azio TV	3716/1434H	1TV (+)	3/4	7(.000)
	BTV World	3725/1425V	1TV	3/4	4(.450)
	TVB 8	3729/1421H	1TV	3/4	13(.650)
	Zee Movies	3732/1418V	3TV	3/4	6(.500)
ATT	TV One	3739/1411V	1TV	3/4	2(.8934
133 200	SAB TV	3743/2407V	1TV	3/4	3(.300)
diam'r.	Fashion TV	3747/1403V	1TV	3/4	2(.625)
195-24 A 30 Km	AAJ-TV	3750/1400V	1TV	3/4	2(.820)
L district of	Arirang TV	3755/1395V	1	7/8	4(.418)
I district to	Now TV +	3760/1390H	up to 10TV	7/8	26(.000)
Matter a	Star TV	3780/1370V	7(+)TV	3/4	28(.100)
	GXTV	3806/1344V	1TV + 3 radio	3/4	4(.420)
	Shaanxi TV	3813/1337V	1TV + 2 radio	3/4	4(.420)
1170	Anhui TV	3820/1330V	1TV + 2 radio	3/4	4(.420)
	Jiangsu TV	3827/1330V	1TV + 2 radio	3/4	4(.420)
	HLITV	3834/1316V	1TV	3/4	4(.420)
	Star TV	3840/1310H	7(+) TV	7/8	26(.850)
	Star TV	3860/1290V	5(+)TV	3/4	27(500)
	Dragon TV	3886/1264V	1 TV	3/4	4(.800)
	Shaandong	3895/1255V	1TV + 6 radio	3/4	6(.813)
144	CCTVI	3904/1246V	1TV, 1 radio	7/8	4(.420)
THE PART OF THE	Jilin TV	3914/1236V	1TV + 2 radio	3/4	4(.420)
	Star TV	3920/1230H	4+ TV	7/8	26(.850)
A PARALESTA	CNNI	3960/1190H	8TV, 1 radio	3/4	27(500)
	StarTV	3980/1170V	6+TV	3/4	28(.100)
	Star TV	4000/1150H	8(+)TV	7/8	26(.850)
	Sahara digital	4020/1130V	8TV, 1 radio	3/4	27(.250)
	Hubei TV	4035/1115H	1TV + 2 radio	3/4	4(.420)
	Tianjin TV	4046/1104V	1TV + 2 radio	3/4	5(.950)
	Sichuan TV	4051/1099H	1TV + 1 radio	3/4	4(.420)
	Qinghai TV	4067/1083H	1TV + 2 radio	3/4	4(.420)
	Hunan TV Fashion/HK-Asia	4082/1068H 4088/1062H	1TV + 1 radio	3/4	4(.420)
			1TV	3/4	2(.626)
1	Pakistani TV Sun TV	4091/1059V 4095/1055H	4TV, 1 radio	3/4	9(.330)
to the state of the	PTV National	4106//1044V	1 ITV 1 radio	3/4	5(.554)
	TVB8 Mux	4111/1040H	1TV, 1 radio 4 TV	3/4	3(.333)
100	Indus News	4111/1040H 4115/1035V	4 I V	3/4	13(.650)
(- FIFT - 3	CCTV bqt	4113/1033V 4129/1021H	A TV A radio	3/4	3(.331)
	Zee Bqt #2		4 TV, 4 radio		13(.240)
		4140/1010V	8(+) TV	3/4	27(.500)
	Henan TV	4166/984V	1TV + 8 radio	3/4	4(.420)
	Fujian TV	4180/970V	1TV + 2 radio	3/4	4(.420)
	Jiangxi TV	4187/963V	1TV + 2 radio	3/4	4(.420)
Cold /107.5	Liaoning TV	4194/956V	1TV + 2 radio	3/4	4(.420)
Cak1/107.5	Indovision (S. band)	2.535, 2.565, 2.595,	33(+) TV	7/8	20(.000)
T'Vom/100F	(S-band)	2.625, 2.655		2/1	001.000
T'Kom/108E	IndoBqt	3460/1690H	up to 6	3/4	28(.000)
C2M/113E	TPI	4185/965V	1	3/4	6(.700)
	Anteve	4144/1006V	1	3/4	6(.510)
	Kabelvision Mux	4080/1070H	7+ TV	7/8	28(.125)
	Indostar	4074/1076V	1	3/4	6(.500)
	SCTV	3934/1216H	1	3/4	6(.620)
	Indo MUX	3880/1270H	3+ TV	7/8	28(.121)
	TVRI	3765/1385H	1TV	3/4	5(.555)

Receivers and Errata	
CA (#1, 3); FTA audio #2	
Late July 04: room for more (FTA) CA + 23FTA(A1TV, IRB3, Visjon Norge, Pakistan	
New 03/03; FTA	1)
Thai + Indian services; FTA inc. Vibe TV, Sindh T	V
3TV, 5radio inc. Hellas TV Greece FTA	
FTA	
3FTA: TV5, VTV4, ATN Bangla	
FTA (reaches SE Australia)	_
Several ETV now here; wide beam	_
SCPC, OK E. Aust wide beam SCPC, OK E. Aust wide beam	-
corrections 12/02	
New - November 2002	
Now CA; was 11.083H	
July 04: FTA	
FTA TV + radio; Russia, Port, Spain, Italy/Euro Bo	r
Real Madrid (V769, A770) English FTA	
Was 3923H; sometimes FTA	
FTA; multiple audio services V2360, A2320	
Sometimes FTA; also 3895Vt	_
FTA & CA	_
5 chs TV, FTA, some tests	
FTA , Dubai Sports Ch some English, soccer- Two Israel, two Russian (REN-TV)	
New 107-06; initially parallel As3S 3.880H	
new here Dec 2004; Euro-French music videos	
Increased coverage; great variety audio chs(03-05))
Sun-TV, Surya TV, KTV (FTA)	
FTA MCPC; Yemen, MBC EUROsport tests	
Now loaded from 96.5E; svrl below 3900 all RHC	
New 07-06; Yanbian, Jilin Satellite TV	
replaces analogue same freq, V33, A32	
Now SECA 2 CA (10-04); Radio Aust. Eng. A201	1
English + V1160, A1120; 525, 625 versions	
Was parallel to 3640Hz analogue (now gone)	
The state of the same of	
Conax CA, all Hindi films	
Also reported 3.333, ¾ October 2005	-
SAB may no longer here here; moved to NSS-6?	
new frequency October 2005	
New April 2005; English, urdu	-
FTA SCPC; New PIDs V3601, A3606 June 2003	
CA + FTA; DW, TV5 here now (late 2005)	-
NDS CA (Pace DVS211, Zenith)	_
Guangxi TV; was As2	
Was As2	
Was As2	
Was As2	
Was As2; HeiLong	
NDS CA (Pace DVS211, Zenith)	
NDS CA (Pace DVS211, Zenith)	
Shanghai	
Apparently Mongolia	_
PowVu CA; new SR Apr 29; CNN radio FTA	
NDS CA; Star News India FTA VPID 514, APID 6	48
NDS CA w/ 4(Chinese) FTA	
New Sr September 2004	
Was As2	
new December 2004	
Was As2	
Was As2	
Was As2	_
New July 2005	
new Sr, channels, April 2006	
"History Channel" - SCPC, some English	
MATV Ch Movies now Irdeto 1	
MATV Ch Movies now Irdeto 1 Hindi (+ "Plus"); day parts	
MATV Ch Movies now Irdeto 1 Hindi (+ "Plus"); day parts moved from 4115	
MATV Ch Movies now Irdeto 1 Hindi (+ "Plus"), day parts moved from 4115 Now SECA 2 CA (10-04), 1 occ. FTA (varies)	
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MATV Ch Movies now Irdeto 1 Hindi (+ "Plus"); day parts moved from 4115 Now SECA 2 CA (10-04); 1 occ. FTA (varies) Was As2 Was As2 Was As2 Was As2 Was As2 Pace IRDs; 2.535 has 2 FTA. Bird now inclined. also 3586H/17.500, 3496H/19.615	
MATV Ch Movies now Irdeto 1 Hindi (+ "Plus"); day parts moved from 4115 Now SECA 2 CA (10-04); 1 occ. FTA (varies) Was As2 Was As2 Was As2 Was As2 NDS CA using RCA/Thomson, Pace IRDs; 2.535 has 2 FTA. Bird now inclined	
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MATV Ch Movies now Irdeto 1 Hindi (+ "Plus"); day parts moved from 4115 Now SECA 2 CA (10-04); 1 occ. FTA (varies) Was As2 Was As2 Was As2 Was As2 Was As2 For Now Secasing RCA/Thomson, Pace IRDs; 2.535 has 2 FTA. Bird now inclined. also 3586H/17.500, 3496H/19.615 FTA SCPA; NT/NC only change from 4055V; FTA SCPC also try 3500H, 27.000, 3/4, strong NZ New (but probably temporary) 07-06	

Bird	Service	RF/IF &	# Program Channels	FEC	Msym
	SCTV	Polarity 3726/1424V	1TV	3/4	6(.620)
	RCTI	3473/1677H	2	3/4	8(.000)
As4/122E	CCTV internal	4100/1050V	6	3/4	27(.500)
Jc3/128		3996/1154V		5/6	
363/128	Miracle Net Asian bqt	3960/1154V 3960/1190V	3 up to 6 up to 8	7/8	22(.000) 30(.000)
1 (124F					
Ap6134E	Multiple	4140/1010V	up to 8	7/8	27(.500)
T18/138	Tests	3460/1690V	8	3/4	30(.000)
Am3/140	STS+	3731/1419R	1	3/4	3(.200)
c2A 154	BYU-TV	3915/1245V	1+ 20 languages	3/4	4(.166) (?)
MeasSs2	Astro Mux	11.602H	up to 17TV	3/4	41(.500)
	VTV MUX	11.522V	3 TV	3/4	9(766)
B3/152	7 Cent. Feed	12.310H	1TV	3/4	5(.100)
	AuroraBiz	12.407V	4 TV, 10 radio	2/3	30(.000)
	UBI	12.425V	up to 13 TV + radio	3/4	22(.500)
	Globecast 2	12.525V	13 TV, 8 radio	2/3	30(.000)
1	Globecast (feeds)	12.550555V	1TV	3/4 & 2/3	6(.110/.670)
1	Globecast	12.564V/T13	2+ TV	2/3	30(.000)
I Fred	UBI	12.613H/T14L	11+TV	3/4	22(.500)
11-7-11	UBI	12.640H/T14U	11+TV	3/4	22(.500)
311	Globecast 1	12.658V/T7	14TV, 15 radio	2/3	30(.000)
THE	UBI	12.674H/T15L	11+TV	3/4	22(.500)
	UBI	12.701H/T15U	11+TV	3/4	22(.500)
	WA ABC	12.701H/113U	1 TV, 1 radio	7/8	14(.288)
1	WA ABC WA SBS		4TV, 2 radio	5/6	12(.600)
		12.720V 12.738V			
01/10	WA GWN/WIN		2TV	7/8	14(.295)
C1/156E	Aurora	12.324V/T1U	11777 0 0	2.11	07/5
112	Pay TV	12.365V/T2	11TV, 2 radio	3/4	27(.800)
	Aurora Home	12.407V/T3	5 TV, 13 radio	2/3	30(.000)
	Pay-TV	12.447V/T4	5TV, 4 data	3/4	27(.800)
N. Free	Pay TV	12.487V/T5	3+ TV, data	3/4	27(.800)
	Aurora 2	12.527V/T6	7TV, 20 radio	3/4	30(.000)
	Pay-TV	12.567V/T7	10 TV	3/4	27(.800)
	Pay-TV	12.607V/T8	10 TV	3/4	27(.800)
1	Pay-TV	12.647V/T9	10 TV	3/4	27(.800)
-	Pay-TV	12.692V/T10L	6TV, 27 radio	1/2	28(.650)
	Aurora MUX	12.728V/T10U	4TV, 17 radio	1/2	24(.450)
7 (30.00)	Austar	12.305H/T11	6TV, 24 data	3/4	30(.000)
	Pay-TV	12.358H/T12	10 TV	3/4	27(.800)
	Pay-TV	12.398H/T13	10 TV	3/4	27(.800)
NI DES					
	Pay-TV	12.438H/T14	6TV, 3 data	3/4	27(.800)
3 4	Pay-TV	12.478H/T15	10 TV	3/4	27(.800)
	Pay-TV	12.518H/T16	10 TV	3/4	27(.800)
	Pay-TV	12.558H/T17	10 TV	3/4	27(.800)
	Pay TV	12.598H/T18	10 TV	3/4	27(.800)
	Pay-TV	12.638H/T19	10TV, 30 radio	3/4	27(.800)
	Pay TV	12.688H/T20	11TV	3/4	27(.800)
B1/160	Central 7	12.365H	1 TV, 1 radio	3/4	6(.100)
	Occ. feeds	12.384V	1 TV - *	3/4	6(.111)
	Imparja mx	12.379H	2TV + 8 radio	3/4	5(.424)
	7 digital feeds	12.397H	1TV	3/4	7(.200)
1	Feeds to NZ	12.411V	1 TV	3/4	6(.111)
T Person	SBS Mux	12.420H	3+ TV, 2+ radio	5/6	12(.600)
	TVNZ Tests	12.483V	up to 8TV	3/4	22(.500)
	Sky NZ	12.519/546V	7TV/7TV	3/4	22(.500)
11/200	Sky NZ	12.581/608V	6TV/6TV	3/4	22(.500)
	Sky NZ	12.644/671V	9TV	3/4	22(.500)
	ABC western	12.610H	5TV	7/8	14(.3288
Do (: -	Sky NZ	12.707/734V	8+TV	3/4	22(.500)
P8/166E	SelecTV	12.526H	8+TV	3/4	28(.800)
	CCTV	12.557H	3+TV	3/4	13(.240)
- PART	ABS-CBN	12.575H	4+TV, 4+ radio	2/3	13(.845)
	MYSAT	12.646H	up to 8 TV	3/4	28(.066)
	JEDI/TVB	12.686H	11+ TV	3/4	28(.126)
15 mail	PnGlobal Aust	12.726H	6+TV	3/4	28.(066)
	ABC A-P	4180/970H	2TV, 2 radio	3/4	27(.500)
	Disney Pac	4140/1010H	typ 6 TV	5/6	28(.125)
1 1	Taiwanese MUX	4080/1070H	12+ TV	5/6	30(.000)
1	NHK Joho	4060/1090H	7TV, 1 radio	1/2	16(.180)
	FOX Mux	4040/1110V	up to 5TV	7/8	26(.470)
	- JAN ITAUA	4121/1029V	1 TV	3/4	4(.774)
	NFT +	1121/1027 V			26(.470)
	NET +	4020/1130H	8+TV data	3/4	
	ESPN USA	4020/1130H	8+TV, data	3/4	
	ESPN USA Discovery	3980/1170H	8 typ.	3/4	27(.690)
	ESPN USA Discovery CalBqt/Pas8	3980/1170H 3940/1210H	8 typ. up to 3+ FTA	3/4 7/8	27(.690) 27(.690)
	ESPN USA Discovery CalBqt/Pas8 CNBC HK	3980/1170H 3940/1210H 3900/1250H	8 typ. up to 3+ FTA up to 7TV	3/4 7/8 3/4	27(.690) 27(.690) 27(.500)
	ESPN USA Discovery CalBqt/Pas8 CNBC HK FilipinoMUX	3980/1170H 3940/1210H 3900/1250H 3880/1270V	8 typ. up to 3+ FTA up to 7TV up to 8TV+radio	3/4 7/8 3/4 5/6	27(.690) 27(.690) 27(.500) 28(.694)
	ESPN USA Discovery CalBqt/Pas8 CNBC HK FilipinoMUX TaiwanBqt	3980/1170H 3940/1210H 3900/1250H 3880/1270V 3860/1290H	8 typ. up to 3+ FTA up to 7TV up to 8TV+radio 12TV + 30 r	3/4 7/8 3/4 5/6 5/6	27(.690) 27(.690) 27(.500) 28(.694) 28(.000)
	ESPN USA Discovery CalBqt/Pas8 CNBC HK FilipinoMUX TaiwanBqt CCTV Mux	3980/1170H 3940/1210H 3900/1250H 3880/1270V 3860/1290H 3829/1321H	8 typ. up to 3+ FTA up to 7TV up to 8TV+radio 12TV + 30 r up to 4 + 1 radio	3/4 7/8 3/4 5/6 5/6 3/4	27(.690) 27(.690) 27(.500) 28(.694) 28(.000) 13(.240)
	ESPN USA Discovery CalBqt/Pas8 CNBC HK FilipinoMUX TaiwanBqt CCTV Mux TVBS-N	3980/1170H 3940/1210H 3900/1250H 3880/1270V 3860/1290H 3829/1321H 3836/1314V	8 typ. up to 3+ FTA up to 7TV up to 8TV+radio 12TV + 30 r up to 4 + 1 radio 1FTA, 4+ CA	3/4 7/8 3/4 5/6 5/6 3/4 3/4	27(.690) 27(.690) 27(.500) 28(.694) 28(.000)
	ESPN USA Discovery CalBqt/Pas8 CNBC HK FilipinoMUX TaiwanBqt CCTV Mux	3980/1170H 3940/1210H 3900/1250H 3880/1270V 3860/1290H 3829/1321H	8 typ. up to 3+ FTA up to 7TV up to 8TV+radio 12TV + 30 r up to 4 + 1 radio	3/4 7/8 3/4 5/6 5/6 3/4	27(.690) 27(.690) 27(.500) 28(.694) 28(.000) 13(.240)
	ESPN USA Discovery CalBqt/Pas8 CNBC HK FilipinoMUX TaiwanBqt CCTV Mux TVBS-N	3980/1170H 3940/1210H 3900/1250H 3880/1270V 3860/1290H 3829/1321H 3836/1314V	8 typ. up to 3+ FTA up to 7TV up to 8TV+radio 12TV + 30 r up to 4 + 1 radio 1FTA, 4+ CA	3/4 7/8 3/4 5/6 5/6 3/4 3/4	27(.690) 27(.690) 27(.500) 28(.694) 28(.000) 13(.240) 17(.500)
	ESPN USA Discovery CalBqt/Pas8 CNBC HK FilipinoMUX TaiwanBqt CCTV Mux TVBS-N EMTV PNG	3980/1170H 3940/1210H 3900/1250H 3880/1270V 3860/1290H 3829/1321H 3836/1314V 3808/1342V	8 typ. up to 3+ FTA up to 7TV up to 8TV+radio 12TV + 30 r up to 4 + 1 radio 1FTA, 4+ CA 1 + 2 radio	3/4 7/8 3/4 5/6 5/6 3/4 3/4 3/4	27(.690) 27(.690) 27(.500) 28(.694) 28(.000) 13(.240) 17(.500) 5(.632)
	ESPN USA Discovery CalBqt/Pas8 CNBC HK FilipinoMUX TaiwanBqt CCTV Mux TVBS-N EMTV PNG CNNI	3980/1170H 3940/1210H 3900/1250H 3880/1270V 3860/1290H 3829/1321H 3836/1314V 3808/1342V 3780/1370H	8 typ. up to 3+ FTA up to 7TV up to 8TV+radio 12TV + 30 r up to 4 + 1 radio 1FTA, 4+ CA 1 + 2 radio 3, up to 5 TV	3/4 7/8 3/4 5/6 5/6 3/4 3/4 3/4 3/4	27(.690) 27(.690) 27(.500) 28(.694) 28(.000) 13(.240) 17(.500) 5(.632) 25(.000)
P2/169F.	ESPN USA Discovery CalBqt/Pas8 CNBC HK FilipinoMUX TaiwanBqt CCTV Mux TVBS-N EMTV PNG CNNI Discovery Asia MTV	3980/1170H 3940/1210H 3900/1250H 3880/1270V 3860/1290H 3829/1321H 3836/1314V 3808/1342V 3780/1370H 3764/1386V 3740/1410H	8 typ. up to 3+ FTA up to 7TV up to 8TV+radio 12TV + 30 r up to 4+1 radio 1FTA, 4+ CA 1+2 radio 3, up to 5 TV Up to 6 TV 8	3/4 7/8 3/4 5/6 5/6 5/6 3/4 3/4 3/4 3/4 3/4 3/4 2/3	27(.690) 27(.690) 27(.500) 28(.694) 28(.694) 28(.000) 13(.240) 17(.500) 5(.632) 25(.000) 19(.850) 27(.500)
P2/169E	ESPN USA Discovery CalBqt/Pas8 CNBC HK FilipinoMUX TaiwanBqt CCTV Mux TVBS-N EMTV PNG CNNI Discovery Asia MTV WA Mux Pv	3980/1170H 3940/1210H 3900/1250H 3880/1270V 3860/1290H 3829/1321H 3836/1314V 3808/1342V 3780/1370H 3764/1386V 3740/1410H 12.281V	8 typ. up to 3+ FTA up to 7TV up to 8TV+radio 12TV + 30 r up to 4 + 1 radio 1FTA, 4+ CA 1 + 2 radio 3, up to 5 TV Up to 6 TV 8 3+ TV, radio	3/4 7/8 3/4 5/6 5/6 5/6 3/4 3/4 3/4 3/4 3/4 3/4 3/4 3/4 3/4 3/4	27(.690) 27(.690) 27(.500) 28(.694) 28(.000) 13(.240) 17(.500) 5(.632) 25(.000) 19(.850) 27(.500) 27(.500)
P2/169E	ESPN USA Discovery CalBqt/Pas8 CNBC HK FilipinoMUX TaiwanBqt CCTV Mux TVBS-N EMTV PNG CNNI Discovery Asia MTV WA Mux Py Ariang TV	3980/1170H 3940/1210H 3900/1250H 3880/1270V 3860/1290H 3829/1321H 3836/1314V 3780/1370H 3764/1386V 3740/1410H 112.281V 12.401V	8 typ. up to 3+ FTA up to 3+ FTA up to 7TV up to 8TV+radio 12TV + 30 r up to 4 + 1 radio 1FTA, 4+ CA 1 + 2 radio 3, up to 5 TV Up to 6 TV 8 3+ TV, radio 1TV	3/4 7/8 3/4 5/6 5/6 5/6 3/4 3/4 3/4 3/4 3/4 3/4 2/3	27(.690) 27(.690) 27(.690) 28(.694) 28(.694) 28(.000) 13(.240) 17(.500) 5(.632) 25(.000) 19(.850) 27(.500) 4(.400)
P2/169E	ESPN USA Discovery CalBqt/Pas8 CNBC HK FilipinoMUX TaiwanBqt CCTV Mux TVBS-N EMTV PNG CNNI Discovery Asia MTV WA Mux Pv Ariang TV ABS-CBN	3980/1170H 3940/1210H 3900/1250H 3880/1270V 3860/1290H 3829/1321H 3836/1314V 3808/1342V 3780/1370H 3764/1386V 3740/1410H 12.281V 12.401V 12.575H	8 typ. up to 3+ FTA up to 3+ FTA up to 8TV+radio 12TV + 30 r up to 4 + 1 radio 1FTA, 4+ CA 1 + 2 radio 3, up to 5 TV Up to 6 TV 8 3+ TV, radio 1TV 4TV, 2 radio	3/4 7/8 3/4 5/6 5/6 5/6 5/6 3/4 3/4 3/4 3/4 2/3 2/3 3/4	27(.690) 27(.690) 27(.690) 27(.500) 28(.694) 28(.000) 13(.240) 17(.500) 5(.632) 25(.000) 19(.850) 27(.500) 4(.400) 13(.845)
P2/169E	ESPN USA Discovery CalBqt/Pas8 CNBC HK FilipinoMUX TaiwanBqt CCTV Mux TVBS-N EMTV PNG CNNI Discovery Asia MTV WA Mux Py Ariang TV ABS-CBN Test mux	3980/1170H 3940/1210H 3900/1250H 3880/1270V 3860/1290H 3829/1321H 3836/1314V 3808/1342V 3780/1370H 3764/1386V 3740/1410H 12.281V 12.401V 12.575H 12.715H	8 typ. up to 3+ FTA up to 3+ FTA up to 7TV up to 8TV+radio 12TV + 30 r up to 4 + 1 radio 1FTA, 4+ CA 1 + 2 radio 3, up to 5 TV Up to 6 TV 8 3 + TV, radio 1TV 4TV, 2 radio 6+ TV	3/4 7/8 3/4 5/6 5/6 5/6 3/4 3/4 3/4 3/4 3/4 2/3 2/3 2/3 2/3	27(.690) 27(.690) 27(.500) 28(.694) 28(.000) 13(.240) 17(.500) 5(.632) 25(.000) 19(.850) 27(.500) 27(.500) 4(.400) 13(.845) 30(.000)
P2/169E	ESPN USA Discovery CalBqt/Pas8 CNBC HK FilipinoMUX TaiwanBqt CCTV Mux TVBS-N EMTV PNG CNNI Discovery Asia MTV WA Mux Pv Ariang TV ABS-CBN Test mux TARBS feeds	3980/1170H 3940/1210H 3900/1250H 3880/1270V 3860/1290H 3829/1321H 3836/1314V 3808/1342V 3780/1370H 3764/1386V 3740/1410H 12.281V 12.401V 12.575H 12.715H 4090V/1060V	8 typ. up to 3+ FTA up to 7TV up to 8TV+radio 12TV + 30 r up to 4 + 1 radio 1FTA, 4+ CA 1 + 2 radio 3, up to 5 TV Up to 6 TV 8 3+ TV, radio 1TV 4TV, 2 radio 6+ TV 9TV + radio	3/4 7/8 3/4 5/6 5/6 5/6 3/4 3/4 3/4 3/4 3/4 3/4 3/4 3/4 3/4 3/4	27(.690) 27(.690) 27(.690) 28(.694) 28(.000) 13(.240) 17(.500) 5(.632) 25(.000) 19(.850) 27(.500) 27(.500) 4(.400) 13(.845) 30(.000) 21(.000)
P2/169E	ESPN USA Discovery CalBqt/Pas8 CNBC HK FilipinoMUX TaiwanBqt CCTV Mux TVBS-N EMTV PNG CNNI Discovery Asia MTV WA Mux Py Ariang TV ABS-CBN Test mux	3980/1170H 3940/1210H 3900/1250H 3880/1270V 3860/1290H 3829/1321H 3836/1314V 3808/1342V 3780/1370H 3764/1386V 3740/1410H 12.281V 12.401V 12.575H 12.715H	8 typ. up to 3+ FTA up to 3+ FTA up to 7TV up to 8TV+radio 12TV + 30 r up to 4 + 1 radio 1FTA, 4+ CA 1 + 2 radio 3, up to 5 TV Up to 6 TV 8 3 + TV, radio 1TV 4TV, 2 radio 6+ TV	3/4 7/8 3/4 5/6 5/6 5/6 3/4 3/4 3/4 3/4 3/4 2/3 2/3 2/3 2/3	27(.690) 27(.690) 27(.690) 27(.500) 28(.694) 28(.000) 13(.240) 17(.500) 5(.632) 25(.000) 19(.850) 27(.500) 27(.500) 4(.400) 13(.845) 30(.000)

Receivers and Errata	
was on 4048V; New Caledonia, parts of Austral	ia
FTA SCPC;or, 3774H, 6.520, 3/4 (June 06)	
Irdeto 2; 4060V HDTV CA; also try 4020V	-
PowerVu; some FTA (Ch. 1 & 3) CA & FTA NTSC: Japan, Taiwan	-
(ApStar 6: also 4180V same #s; some analogue a	so)
also try 3660/3540VVt, Sr 30.000, 3/4; some F	ГА
North beam; also try 3875R, 12.475, 1/2 Strong NZ & Australia; may now be 1/2, 6.525	-
Aust East beam - 3 FTA + 14 CA	1
WA only? Skew path, intended Asia	
Was B1; moved June 2006, concerns B1 failure	
differs from 12.407 C1; tune ch FTA; NZ+A	и
Now Irdetio V2 NZ + Au, FTA + Mcrypt CA	
occ feeds, NZ + Au; recently 12.553V	
AMTV, Healing only FTA svcs now here	
High performance beam; not NZ; new CA 07-0 High performance beam; not NZ; new CA 07-0	6
NZ + Au (Mcrypt, PowVu capable)	0
High performancebeam: not NZ: new CA 07-0	6
High performance beam; not NZ; new CA 07-0	6
ABC WA tests, FTA SBS, radio tests WA FTA	_
Irdeto V2 CA, tests (GWN, WIN)	-
not currently in use	
Tests; SBS-NDS CA, others FTA when here	
NZ (90cm) + Australia (Only C1 svc left on N Australia NA only (leakage to Norfolk, New Ca	
Australia NA only (leakage to Nortolk, New Ca Australia NA only (leakage); 9-Net x 3 widescre	en
Arrow radio (still here), tone FTA	
Pay-per-view movies; CA	
Pay-per-view movies; CA Pay-per-view movies; CA	-
ABC for Foxtel/Austar; previously 12.288V	
changes September 2005	
Austar inter; Expo FTA	
NDS CA + Mcrypt; CA	
CA, subscriptions available Australia, Norfolk Sky News active; 'Help x 2' FTA	
CA, subscriptions avail Au, Nrflk; TVSN FTA	
CA, subscriptions available Australia, Norfolk	
"Home"CA, subscription available Australia, Nr	
CA, subscriptions available Australia, Norfolk CA, subscription available Australia, Norfolk	
CA, subscription available Australia, Norfolk	
also reported B3, 12.310H	
* - plus 12.293V, 402V, 411V, 451, 460H	
PIDs vary; also try 12.360, 12.370 occ. digital feeds; typ fta	
Often NTSC; USA-Australia-NZ	
Also 12.437H, 12.456H same params; HDTV+	WS
(12.456 now shut down); 16:9 added late July	
NDS CA, subscription available NZ NDS CA, subscription available NZ	-
NDS CA, subscription available NZ also see 12.610, .626, .643, .670, .688, & .706H	I
NDS CA, subscriptions available NZ	
&12.286, 12.326; FTA prev526 V10112, A10 FTA-Australia	12
CA -Australia	
FTA V=5340, A=790 -Australia	
June 2002-Irdeto-2 CA - Australia	
Some FTA-Australia	
Dateline west; also east PAS2, 3901V PowVu CA	
Tests - CA service announced	
PowVu CA & FTA; sub available-changes 05-0)6
was PAS-2, previously 3992Vt; feeds FTA	
NET25 + FTA; new PIDS April '03; reload PowVu CA; ch 11 DCP-CCP bootload; audio F	ΓΔ
PowVu/CA (some audio FTA)	- /%
PowVu CA & FTA (EWTN + CBS +TBN +	
NDS CA (6 channels); one test card occ FTA	
Myx FTA V1960, A1920 + radio FTA Mixed FTA & CA; STC gone (CA)	
PowVu FTA, replaces PAS-2 svc	
CCTV cross pole; new SR 04-06	
PowVu CA	
PowerVu; some audio FTA PowerVu; Asian MUX; new parameters Nov 'C	3
# 8 MTV China FTA V289, A290; rest CA	
PowVu CA, WIN, ABC NT, SBS; status unkno	
Test - may not stay permanently	
Temp FTA; subs Aust 011-800-2270-0722	
Temp FTA; subs Aust 011-800-2270-0722 initially with 6 NTSC colour bars	03
Temp FTA; subs Aust 011-800-2270-0722 initially with 6 NTSC colour bars Occ FTA (Chile +); BIG power reduction Nov Started 07-06; India test service	03
Temp FTA; subs Aust 011-800-2270-0722 initially with 6 NTSC colour bars Occ FTA (Chile +); BIG power reduction Nov	03



PROFESSIONAL RACK MOUNT FTA MPEG-2 + 1 DIGITAL RECEIVER

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Italian: \$29.95 per month
Vietnamese: \$29.95 per month
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*The customer will get 2 extra months free once they activate and pay for the first months subscription **by credit card only**. Card needs to be activated within 30 days of purchase from us to qualify. This is only with receiver package 2.



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Unit 2/22 Hills Street, Garbutt 4814 Townsville Queensland Australia
Website: http://www.kristal.com.au email: philip@kristalelectronics.com

SatFACTS Digital Watch: Supplemental Reference Data / November 2006

Bird	Service	RF/IF & Polarity	# Program Channels	FEC	Msym
(PAS2/169E)	Adventists.tv	4040/1010H	1	2/3	5(.900)
	Feeds	3868/1182H	1	2/3	6(.620)
Linesan la sur	Feeds	3939/1211H	2 (typ NTSC)	2/3	6(.620)/7(.498)
	Cal PowVu	3901/1249H	up to 8	3/4	30(.800)
	HK bouquet	3850/1300H	up to 8	2/3	24(.900)
	Korean Bqt	3771/1379H	1	3/4	6(.510)
AMC23/172E	Various-tests	12.730H	up to 8	3/4	30(.000)
I804/174E	iPSTAR	12.619H	1	2/3	25(.220)
	Tests-NZ beam	12.646H	1	3/4	22(.418)
THE STREET SHE	RFO Poly	4027/1123R	1TV	3/4	4(.566)
I701/180E	TNTV	11.060&11.514V	9	3/4	30(.000)
	TVRFO	11.136V, 11.174V	6+TV, 3+ radio	3/4	23(.149)
	Canal+Sat	11.610H	16TV, 1 radio	3/4	30(.000)
	PBS	12.648HH	16TV possible	3/4	28(.066)
MESSILI	TVNZ/BBC	4186/964RHC	1	3/4	5(.632)
	TVNZ	4178/972RHC	see aleses	3/4	5(.632)
	AFRTS DTS	4175/975L	3 TV, 3 radio	2/3	3(.680)
a anim	TVNZ/Aptn	4170/980RHC		3/4	5(.632)
144,150,150	Fiji Sky Pacific	4095/1055LHC	6TV + future radio	3/4	16(.505)
TAME	Fiji Sky Pacific	4055/1095LHC	7TV + future radio	3/4	16(.505)
	TVNZ/feeds	4052/1098RHC	1	3/4	5(.632)
	TVNZ feeds	4044/1106R	Soor brook	3/4	5(.632)
	NBC to 7 Oz	3960/1190R	1	7/8	6(.447)
2-11-010	TBN Mux	3927/1223R	4TV	2/3	11.(394)
	WorldNet	3886/1264R	1TV, 37 radio	3/4	25(.000)
BEHAMIN THE	Ioarana	3772/1378L	100/1000	3/4	4(.566)
	NASA TV	3854/1296R	1 TV	3/4	2(.000)
	TVNZ	3846/1304R	1 4 1	3/4	5(.632)
	NBA (Barker) Ch	3803/1347R	1	3/4	6(.111)
	USA feeds	3749/1401R	4?	?	26(.400)
NSS-5/177W	Pacific IP Data	3763/1387R	none-data	3/4	27(.500)
	RFO/Tempo	3920/1230R	1	3/4	2(893)
STEEL STREET	BYU-TV	4185/965R	1TV, 20+ audio	1/2	6(.525)
7	Australia Temp.	12.522V ·	8 SCPC	7/8 & 5/6	14.294 & 12.60
TO CAST INC.	Auckland Teleport	12.612V	1 SCPC	3/4	5(.789)
	iPSTAR Tests	12.691V	8 TV	5/6	17(.600)

	Receivers and Errata New December 2003; 24/7 "Hope Chs."
	FTA (occ sport); also try 3863, Sr6.100
	FTA-typ NTSC-occ sport, live Shuttle
	PowVu CA + FTA(includes BBC-W 05-05)
	was 4148Vt, some FTA
	Korean MUX, reload 12-04; new Sr
-5	Testing on NZ/East Australia beam
	Tests, late May start; also 12.646H
- 80	Testing possible data links; June 2003
1	SE spot beam; was 4027LHC
	east spot; 10TV + r each, vertical pol.
FT/	11.136 Tahitian beam, 11.174 west beam; 12/04
	1+ FTA, MediaGd "2"; + 10.975 weaker
Tes	ting Fiji region pay-TV (MDS) package (Oct '04)
	DMV/NTL early vers. occ feeds, typ ca
	DMV/NTL early vers., occ feeds, typ ca
'DT	'S Direct to Sailors; audio previously FTA - gone
	DMV/NTL early vers. occ feeds, typically ca
	Nagravision CA (> Feb 1, 2005) New PIDS
	All now (including Fiji 1) CA; 7 Feb, 2005)
121	DMV/NTL early vers.,occ feeds, typ ca
	SCPC, mixed CA and FTA feeds
	CA, Leitch encoded
C	January 2006-now 4 channels, new Sr
	New PIDs Dec 03 very strong NZ, Pacific
10	FTA SCPC; East Hemi Beam-Tahiti
24	/7 live NASA - West Hemi bm (can be difficult!)
	SCPC, mixed CA & FTA, feeds
	NBA feeds - probably CA - new Nov 2003
Man	16-QAM (not MPEG-2 compatible)
	Data only but useful for dish alignment
100	Wallis & Futuna Island(s) service
160	Global beam - requires sizeable dish
Au	st beam: 12.522, 538,555,574,604,621,639 & 65
N	EW Sept 2006; MCPC coming; SPACE Tuesdays
C	A Tests - Taiwan TV; data coming?? (NZ beam)

MPEG-2 DVB Receivers: (Data here believed accurate; we assume no responsibility for correctness!)

AV-COMM R3100. FTA, excellent sensitivity (review SF May 1998); new version Sept. '99. AV-COMM P/L, 61-2-9939-4377.

AV-COMM Tiny Tot. FTA, 12Vdc operated, palm sized, low power consumption; review SF#120. Contact # above.

Coship 3188C. Review SF#107. Blind search FTA rcvr, works well. Phoenix Technology Group (www.phoenixsatellite.com.au) (Irdeto 2 as well as FTA versions)

Coship FTA, CA, HDD. Review SF#143, state of art functions, blind search. Phoenix (above), Satlink NZ, fax 64-9-814-9447;

Divitone: "Left-handed" review SF#115; does "code key" entry. Available https://www.satmax.ws

eMTech eM-100B (FTA), eM-200B (FTA + Clx2), eM210B (FTA + 2xCl + positioner); KanSat 61-7-5484 6246 (review SF#89)

eM-150/Homecast. FTA + embedded multi-format, review SF#144. Sciteq (61-8-9409-6677) and Kristal (61-7-4728 7704)

Fortec Star Lifetime. Two versions, both blind search, code-key programmable, one X 2 Cl. Review SF#119. www.aDigitaLife.com

Homecast (em-150, eM-1150, eM-2150) series of FTA, CA, HDD sate of art STBs, review SF#144. Sciteq (www.sciteq.com.au)

Humax ICRI 5400 (Z). Embedded Irdeto + 2 CAM slots; initial units had NTSC glitch, now fixed. Widely available; new software avail 04-04, SF#76.

Humax IRCI 5410 (Z). Adaptable version capable of holding multi-CA systems (SF#98, 99). Widely available; original importer Sciteq (www.sciteq.com.au).

Hyundai-TV/COM. HSS100B/G (Pacific), HSS-100C (China) FTA. Different software versions; 2.26/2.27 good performers, 3.11 and those with Nokia tuners also good; later 5.0 not good. **Hyundai HSS700**. FTA, PowerVu, SCPC/MCPC. Review SF March 1999. Kristal Electronics, 61-7-4788-8902.

Hyundai HSS800Cl. FTA, Irdeto (with CAM) + other CA systems, PowerVu, NTSC. Kristal Electronics, above; review SF#63.

INNOVIA IDS3088. Review SF#111. Blind search FTA receiver. High quality IRD; available Phoenix TechnologyGroup, and Satmax (http://www.satmax.ws).

ID Digital CI-24 Sensor. New August 2003; new lower noise tuner, extra sensitivity; CI Interface slot Irdeto 1 & 2; review SF#109. Sciteq 61-8-9409-6677.

KSF-570 FTA digital receiver, import; KSC-570 adds CI x 2 (no test or user results available). Asoft Limited, 64-4-234-1096

KSC-N550H2 'Premium Dual DVR' digital receiver (no test or user results available). Asoft Limited, 64 4 234 1096

MediaStar D7.5. New (May 00) single chip FTA; review June 2000 SF. MediaStar Comm. Int. 61-2-9618-5777 (www.mediastar.com.au)

MediaStar D10. FTA and Irdeto embedded CA. VG receiver; see review SF#96, August 2002. Contacts immediately above.

MultiChoice (UEC) 660. Essentially same as Australian 660, not grey market contrary to reports. Sciteq tel 61-8-9306-3738 Nokia "d-box" (V1.7X). European, FTA, may only be German language, capable of Dr. Overflow software. SF#95, p. 14.

Nokia 9200/9500. When equipped with proper software, does Aurora, originally did pay-TV services provided software has been "patched" with "Sandra" or similar program. See SF#95, p. 14, SF#96 p. 15. SatWorld 61-3-9773-9270 (www.satworld.com.au)

Pace DGT400/DVR500. Originally Galaxy (Now Foxtel+Austar). Irdeto, some FTA with difficulty (Foxtel Australia 1300-360818). UECs replaced. Pace "Worldbox" (DSR-620 in NZ). Non-DVB compliant NDS CA including Sky NZ, no FTA; similar "Zenith" version (see SF#115, p. 15).

Phoenix 111, 222, 333 models (no longer produced): Service, backup - Phoenix Technology Group 61 3 9553 3399; www.phoenixsatellite.com.au
Pioneer TS4. Mediaguard CA (no FTA), embedded Msym, FEC, only for Canal+Satellite (AntenneCal ++687-43.81.56)
PowerVu (D9223, 9225, 9234). Non-DVB compliant MPEG-2 unless loaded with software through ESPN Boot Loader (see below). Primarily sold for proprietary CA (NHK, CMT etc). For service only - call Scientific Atlanta 61-2-9452-3388. For revision model D9850, see Scientific Atlanta (below). **PowTek.** Blind Search Chinese sourced, field tests rate it highly. Source jason@aDigitaLife.com

Poware Library Search Chinese sourced, field tests rate it highly. Source jason@aDigitaLife.com

Prosat 2102S. FTA SCPC/MCPC, NTSC/PAL, SCART + RCA. Sciteq 61-8-9306-3738.

SatCruiser DSR-101. FTA SCPC/MCPC, PowVu, NTSC/PAL, (Skyvision Australia 61-3-9888-7491, Telsat 64-6-356-2749); no longer available.)

SatCruiser DSR-201P. FTA SCPC/MCPC, PowVu, NTSC/PAL, analogue, positioner - (Skyvision - see above); no longer available.

SATWORK ST3618. Blind search FTA receiver. Fast search, problems, especially in "memory-filing" system; review SF#111. Available DMSi at tim@dmsiusa.com.

SATWORK ST3688. Blind search, 3000+ ch memory, multi-format RF modulator; improved version 3618. Review SF#113; available DMSi (above).

Scientific Atlanta D9223, D9234, D9225; Orig. PowerVu, superceded Dec 2003 by D9850. Commercial receiver, available TVO 61-2-9281-4481, John Martin

Strong Technologies SRT2620. SCPC, MCPC FTA, exc sensitivity, ease use, programming. Review SF#91 (ph. below).

Strong SRT 4600. SCPC, MCPC, PowerVu, exc graphics, ease of use, review SF#64. Strong Technologies 61-3-8795-7990.

Strong 4800. SCPC, MCPC, embedded Irdeto+ CAM slots, does code-key with additional software, Aurora. Strong Technologies 61-3-8795-7990.

Strong 4800 II. SCPC, MCPC CAM slots x 2 for Aurora +, Zee, Canal +, code key with additional software. Strong Technologies (above); review SF#103. Strong 4890. SCPC, MCPC, 30Gb PVR, 2 CAM slots, DiSEqC 1.0, 1.2 (review S##84), does code key with additional software, Strong Technologies, # above. UEC Atlas/Titan (1000). New July 2003, replacing DGT400 for Austar. No SCART, L-band loop; also available Rural Electronics 61-2-6361 3636.

UEC642 Designed for Aurora (Irdeto), approved by Optus; w/new software, C-band FTA; faulty P/S. Norsat 61-8-9451-8300. UEC660. Upgraded UEC642, used by Sky Racing Aust., Foxtel, limited FTA. (Nationwide - 61-7-3252-2947); P/S problems.

UEC700/720. Single chip Irdeto built-in design for Foxtel; unfriendly for FTA. Power supply problems, seldom sold to consumers; propensity to fall off back of trucks.

"X" Digital. When modified with "aftermarket" Internet softwre, does Aurora and other V-1 CA without card; review SF#119. Strong Technologies (61-3-8795-7990). Accessories:

Aurora smart cards. MCRYPT (Irdeto V2) cards now available (Jan 2005), Sciteq 61-8-9409-6677.

PowerVu Software Upgrade: PAS-8, 4020/1130Hz, Sr 26.470, 3/4; pgm ch 11 and follow instructions (do not leave early!)
PowerVu (Pacific) repair service: Cable & Sat Svcs, Darius West, 61-2-9792-1421 (Email darius@cases.net.au)

WITH THE OBSERVERS

AT PRESS DEADLINE

November 15th: Whatever D1 beam SKY NZ is now on, most report 3-5 dB more signal than previous B1 levels. Alas, TVNZ's 12.483Vt remains (at presstime) on B1- copyright issues apparently the reason. This could mean a 9-12 month delay for FreeView or CA for FreeView!

AsiaSat 2/100.5E: "Al Jazeera loads within Now TV bouquet (3760H, 26.000, 7/8) but is at this time a continuously rotating loop (V=1090, A=1091). (DM, NSW)

AsiaSat 3S/105E: "Jilin TV + 3 radio are gone from 3914V." (Pony) "MTV Pakistan had replaced Indus Music 3760H, FTA for now." (Pony)

<u>Intelsat 701/180E</u>: "VOA and attachments now shut down on 3886R." (Gerry)

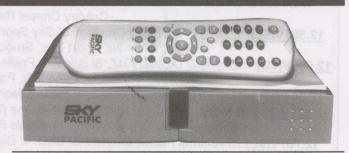
NSS5/177W:

Optus B1/160E: "According to a little circulated SKY NZ memo, B1 officially is not scheduled for replacement until June 2007. That may be the point where the August 2006 switch to inclined orbit exceeds the beamwidth of 60/72cm dishes based upon someone's optimistic calculation that between now and then nothing unpleasant happens to B1. It also conveniently fits into the rushed announcement that D2 is being reconfigured as D1R and they hope to launch it in May 2007. It all comes down to the public's perception of the safety net being drawn around B1." (IH, Wellington)

Optus B3/152E: Note: This satellite is 'in reserve' to be moved to 160E in the event B1 fails before D1R is available to take over B1's position. All B3 services will with no or short warning simply cease to exist if B1 fails requiring transfer of B3 to 160E. B3 should be considered an "in orbit spare" subject to immediate reassignment at anytime.

"Globecast T13/12563H (30.000, 2/3) - 'Aghapy' (coptic religious) and 'AMTV' (Australian mulicultural TV) are both now CA Irdeto V2 (November 6); subsequently, 'AMTV' seems to have shut down. 'Aremenian TV; has been added (V=2160, A=2120) and is FTA at presstime. And 'Narodini Radio' (A=1922) is also new, stereo, FTA; possibly Russian. 'CMC' (Croatian music channel) converted from FTA to CA (Irdeto V2) end of October. 'SAFE TV, US Christian channel added here August, ceased in mid-October. 'Polsat 2', also on UBI, started 4 October FTA and converted to Irdeto V2 November 3. " (IF, Qld.) "Vision Asia 12.657V (20.000, 2/3) has been FTA for a few hours at a time, as recently as 11 November. Imparja's feed continues 12.390H, 5.423, 3/4. ABC news feeds continue on 12.319H, 12.328H, 12.337H (6.980, 3/4). (AI, Qld)

Optus C1/156E: "T10(U)/12.728V, 24.450, 1/2 - the EPG of ABC SE has been an 'hour out' since the switch over from standard to daylight time October 29. Of interest, the EPG for Foxtel and Austar ABC SE were corrected the day it began." (IF, QLD) "Sci-Fi channel is new 12.598H (27.800, 3/4;



Just in case you have never seen one to hold in your hand - this is the Fiji-based SKY Pacific CA STB that uses Nagravision (2). After a few mis-interpreted 'false alarms' we all now know that even though the I701 C-band footprint is massive and reception on C-band dishes under 2m in size is practical from southern New Zealand north to at least the equator, and Norfolk-New Caledonia to Tahiti, the service has been very careful about establishing authorised service areas through carefully screened local agents in such places as Samoa and Tonga.

If D1 is REALLY broken -

Option 1: Repolarise up to 1 million dishes for D1 at 160E, replacing a percentage with larger dishes;
Option 2: Move D1 to 152E, B3 to 152E (fewer dishes for 152E to reposition or replace)
Option 3: Write off D1 and pray that B1 lasts until May when at-earliest D1R might be launched.
D1 Parameters: Transponders 1 to 8 range between 12.281.90 and 12.720.10, supposed to be vertical polarity with 52 dBw at borsight for 27 MHz width half-transponder operation. Transponders 9 to 16 split beam NZ + Australia, horizontal, 47 dBw at boresight for 27 MHz half transponder format.

V=1061, A=1062) with official launch 1 December." (NS, Victoria)

Optus D1/160E: Unknown status.

<u>PanAmSat PAS8/166E</u>: "BBC World India launched 3940H but then switched to CA." (Steve)

<u>Soapbox</u>: "SelecTV continues to be a heavy advertiser on WIN TV Orange (which of course owns SelecTV indirectly). The latest advert is for 'Movie One' on SelecTV. Austar is responding with a SMS or telephone quiz context to win a home entertainment package ." (Grant) "Australian Telstra

WITH THE OBSERVERS: Reports of new programmers, changes in established programming sources are encouraged from readers throughout the Pacific and Asian regions. Information shared here is an important tool in our ever expanding satellite TV universe. Photos of yourself, your equipment or off-air photos taken from your TV screen are welcomed. TV screen photos: If PAL or SECAM, set camera to f3.5-f5 at 1/15th second with ASA 100 film; for NTSC, change shutter speed to 1/30th. Use no flash, set camera on tripod or hold steady. Alternately submit any VHS speed, format reception directly to SatFACTS and we will photograph for you. Deadline for December 15th issue: December 4th by mail or 5PM NZT December 5th if by fax to 64-9-406-1083

Reloading of Sky NZ to D1 (Had it happened!)

12.483V(4U): Actually TVNZ 'Freeview' transponder but carrying several SKY available channels as follows: TVOne southern-North island, TVOne South island, TV2 southern-North island, TV2 South island, Maori TV (all FTA within SKY NZ bouquet) plus CCTV-9 and DW-TV (FTA but only within Freeview test package, not within Sky).

12.519V(5L): 1/Sky Movies 1, 2/Cartoon Net, 3/Sky News NZ, 4/ J2, 5/Sky TV Promo, 6/ CTV1 + National Radio, Concert FM, Niu FM, Tahu FM (all FTA), and, George FM, Classical, Kids, Ad Tracks (CA).

12.546V(5U): 1/Sky Sport 1, 2/ History Channel, 3/ Living Channel, 4/ Playhouse Disney, 5/ Spice 2, 6/ Food TV, 7/ CTV2, 8/ CTV3, 9/ Phoenix Chinese, + Real Good Life, New Supremeo, UP FM, Blues (all CA radio) and Calvary Chapel Radio, Mai FM (FTA).

12.581V(6L): 1/ UK TV, 2/ Rugby Channel, 3/ Sky Sport 2, 4/ National Geographic, 5/ Arts, 6/ NHK Premium, 7/ CTV5 + NZ Chart Pop, Smooth (CA) and Kiwi (radio); FTA.

12.608V(6U): 1/Sky 1, 2/ Dicovery NZ, 3/ Juice, 4/ Prime TV, 5/ E!, 6/Sky Sport 3, 7/ KTV1, 8/ CCTV, 9/ Shine TV + Jazz, House, 50s and 60s, Party, Rock, Country (all CA radio).

12.644V(7L): 1/ ESPN, 2/ Sky Movies 2, 3/ Nickelodeon, 4/ TV3, 5/ C4, 6/ Box Office Movies, 7/KTV2, 8/ CTV6. 12.671V(7U): 1/ MGM, 2/ TAB, 3/ Rialto, 4/ TVNZ One (North Island - FTA), 5/ TV2 (North Island - FTA), 6/ CTV7 + Groove (radio CA) and game channels Playin'TV, Weather Channel, My Interaction.

12.707V(8L): 1/ Amimal Planet, 2/ CNN, 3/ BBC, 4/ Disney, 5/ Southland TV, 6/ Playboy TV, 7/ Spice, 8/ TCM. 12.734V(8U): 1/ Sky Box Office (SBO), 2/ SBO, 3/ SBO63, 4/ SBO64, 5/ SBO65, 6/ SBO66, 7/ SBO.

'NextG' mobile telephone network carries 12 Foxtel TV FreeView STB in companion with

channels (to mobile phones). Included are Discovery Mobile, (www.hillssignalmaster.co.nz)." (Lenny) "SBS has been using CNN, The Comedy Channel, E!, Fashion, Fox 8, Fox Sports ABC news feed links but changing the PIDs slightly - simply News, MTV, Sky News Headlines, Sky News Business and reload if you have lock but not audio or video. 'Fox Sports' Rugby Union. The web site is www.telstra.com/nextG." feeds are rarely CA, for example on November 3, 'Fox Sports (Thomas) "Hills is promoting their own version of the FTA 1' feed on 12.400H, 6.670, 3/4 ran 2 hours of live boxing from



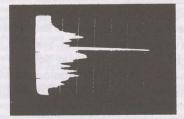
Av-Comm Pty Ltd

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Ph - 02 9939 4377 Fax - 02 9939 4376 Website - http://www.avcomm.com.au Email - cgarry@avcomin.

Since late 2004 broadband interference in the C-band satellite spectrum has been ever present in the Sydney metropolitan area wiping out an estimated 10,000 C-band viewers as well as many commercial sites. This interference caused by Unwired Australia has now spread to Melbourne. To fight this interference, Av-Comm has designed a range of products to allow customers to continue using C-band systems.

- IF Filter 950-1450Mhz
- Dual Polarity 3.7 4.2Ghz LNB with 3.5Ghz Notch Filter
- Single Polarity PLL 3.7 4.2Ghz with 3.5Ghz Notch Filter
- Waveguide Filter 3.7 4.2Ghz



Spectrum Showing Unwired

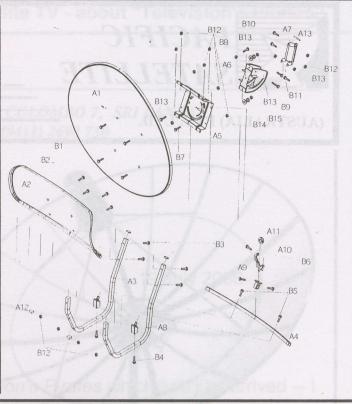


Spectrum After Filtering

As each site that suffers interference is different, there is no one fix for all affected sites but over the past two years we have developed many combinations to give you the best chance of beating this problem. Our commercial solutions have a 100% success rate. If you are experiencing problems caused by interference feel free to call us and we will help find the best solution for you.

Toroidal T90 Home

The "magic" design of toroidal shaped offset reflectors, creating the possibility of intercepting two or more separately placed geostationary satellites. continues to be a magnet attracting the optimistic and adventuresome. The latest is Toroidal New Zealand with a flash web site (http://www.toroidal.co.nz) claiming the ability to stack "up to seven" LNBFs to cover a greostationary swath from 177W to 152E. Toroidal reflectors fall into two categories - those that allow you to stack two or more LNBFs out front but pointing at the shaped reflector, and as with the T90 shown here, using a separate sub-reflector (A2 in diagram, where A1 is the primary reflector). In the best case a 90cm reflector will function no better than a 60/65cm single focus reflector in either design. What you get is one (slightly) larger dish covering two or more satellites, instant switching between satellites (by DiSEqC choosing the appropriate LNBf) with no motors or other hardware to actually move the dish. What you don't get is optimised performance on ANY satellite) as you could with a single feed LNBf and motor driven dish. What you do get is a small fortune tied up in LNBf devices and lots of RG6 to run inside to your DiSEqC configured receiver. Ku only!



Blacktown RSL (Sydney) FTA. (ID, Qld). "UEC remotes: It name - for reasons only they understand it. It is now 'Free TV appears that UEC uses the same identical remotes for Aurora 642, Sky Racing 660, Foxtel 700/720, Austar Atlas Titan, UBI 990 and SelecTV 990. There is a downloadable pdf file of on the UEC990 on SelecTV's web site. Anyone with two or more UEC receivers will find interaction between remotes (such as having SelecTV and UBI in the same room). (Grant) "SelecTV seems to have taken a step which neither Foxtel nor Austar have been willing to do. 'Curve TV' is their standard 20 channel package that includes 'Out TV' which is promoted as 'Australia's first dedicated GLBT (gay, lesbian, bisexual and transgender) channel.' This channel originates in Canada. The SelecTV web site in early October was promoting the addition of an 'adult channel' but now that promotion seems to have been dropped in favour of language claiming that for confidentiality reasons the new 'adult channel cannot be named.' " (Ted R.) "When DTT (terrestrial) finally gets underway in New Zealand, certainly not before the end of 2007, Sky owned Prime TV plans to be HD from day one." AU, Wellington) "FreeView? In the UK they have changed the

Land'." (Peter)

UBI Updates

UBI is currently using UEC 990 STBs but there are problems here. On a 990, the channels load much like Foxtel opr Austar load - a 'bouquet loading system'. Previous UEC receivers, such as the 642 original, will divide TV and radio channels into two lists but selecting channels on T11L/12.425H or T11U/12.452H produce no reception because UBI has inverted these two (half) transponders. In mid-Ocober, 'Channel 72' ('Info Channel') began anew running a loop listing all of the UBI services available (a combination of a mosaic and a looped list) with a 'current date' of 18 October. The FTA 'Community Channel' which is SID 44 is the 11th channel on T14U/12.640H (22.500, 3/4), the 50th channel in the 78 channel network load and appears as channel 150 in the Bouquet list (this includes radio with TV). In October, UBI added 'BHTV' (Bosnian) on 12.452H, AJI (to become 'Al Jazeera English,' also 12.452H), 'BHTR Radio' (12.640H), 'ELT' (a Greek channel replacing Arabic Alam on 12.452H) and 'PPV' (pay per view) added to 12.452H. Promos claim new Spanish, Greek, Balkan channels will be added in the future.

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Post D1 Failure - Revised FreeView schedule

Satellite: No service prior to June 2007, totally dependent upon successful rebuilding of D2 into D1R, launch, positioning and appropriate check-out. Existing limited service on 12.483Vt likely to be scaled back even further. And with failure of D1, MPEG-4 once again looks possible for satellite launch late in 2007; don't count it out yet!

Terrestrial: Longest lead time is the delivery of terrestrial UHF band IV and V COFDM transmitters and matching transmission antennas. Target date is end of third guarter 2007 (September) to have DVB-T transmitters functional in major cities (Auckland, Wellington, Christchurch) in time for Christmas 2007 marketing effort by major retailers.

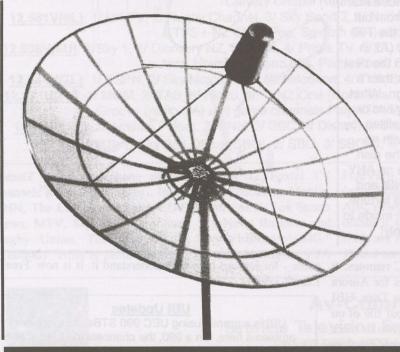


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Email: info@psau.com

http://www.psau.com

From "The Father" of home satellite TV - about "Television's Pirates"

Sir Arthur C Clarke

'LESLIE'S HOUSE', 25, BARNES PLACE, COLOMBO 7, SRI LANKA PHONE: (9411) 2694 255, 2699 757, FAX: (9411) 2698 730

Bob Cooper
P O Box 330
Mangonui
Far North
New Zealand

19 July 2006

Dear Bob.

Many thanks for the copy of *Television's Pirates* which has just arrived -- I can barely lift it!

I'm very glad you wrote your memoirs, because this is a fascinating collection of anecdotes and a vital part of the TV broadcasting and satellite communication history. It's a part that official writers and pure academic researchers may well underplay in their own accounts.

"...a fascinating collection of anecdotes and a vital part of the TV broadcasting and satellite communication history."

In October 1945, (Sir) Arthur C Clarke conceptualised geostationary satellites - the precise placement of earth-orbiting 'in place' satellites equipped with solar-refreshing powering systems and microwave relay equipment capable of receiving earth-originated transmissions and rebroadcasting these signals to earth. Clarke's hypothesis appeared in British publication "Wireless World" and attracted but limited response. World War Two was barely completed, microwave technology was little understood while rocketry - the essential ingredient required to launch into orbit "radio relay stations," an even less mature technology. But this was the origin of satellite TV and from this technology paper would come the direct-to-home television we all enjoy today. "Television's Pirates: Hiding behind your picture tube" traces this development focusing on the individual creators who made it all work - the people who turned Clarke's theory into reality.

Sir Arthur C. Clarke and more than 700 other individuals are featured in "Television's Pirates." This is the true story of how the entire world reacted when Clark's hypothesis became fact. A typical reader response:

"I received 'Television's Pirates' today and as today is my day off, I managed to read the first chapters. It is really great - I have never read anything so detailed on the television (reception) business. Additionally, my CATJ + CSD set of DVDs have also arrived; I have not been this fascinated in ages! I am torn between the CATJ and CSD features and completing Television's Pirates!"

(James Stanley Barr, Frankston, Texas)

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☐ "Television's Pirates" - the book (no DVD); US\$29.95, NZ\$48 including postage - A\$40 plus
shipping charges (rest of world - US\$29.95 plus postage).
☐ SatFACTS Monthly 12 month subscription - beginning with issue # 145 (September 2006); US\$75,
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